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The International Astronomical Union

CAMBRIDGE, MASSACHUSETTS

Immediately after the eclipse of August 31 the astronomers who had been quite widely distributed throughout New England and Canada for that event turned their steps in the direction of Cambridge, Massachusetts. The Fourth General Assembly of the International Astronomical Union, scheduled to be begun there on September 2, was the attraction which drew the astronomers thither. The usual program of the International Astronomical Union calls for a session once in three years, but because of the exceptional circumstance of the total eclipse, occurring in a region near the place where the session was to be held, a period of four years intervened since the Third General Assembly in Leyden in 1928.

Arrangements were made for housing the members and invited guests in the dormitories of Radcliffe College. The meetings were held in Longfellow Hall, one of the recitation buildings of Radcliffe College, located within easy walking distance of the dormitories. The published list of delegates and guests who had made reservations contained the names of 227 persons; of these 109 were from the United States; 10 from Canada, and the remainder from foreign countries. Representatives were present from a total of 24 countries.

Although the first event in connection with the Fourth General Assembly was scheduled for September 2 the local committee had provided entertainment for those who arrived in Cambridge before that date by arranging visits to points of special interest in Boston and in Cambridge.

The session was officially opened on Saturday morning, September 3, in what was termed a General Assembly, held in the large lecture room of Longfellow Hall of Radcliffe College, and attended by practically all the members and invited guests. Professor Harlow Shapley, director of the Harvard College Observatory, called the assembly to order and introduced the Honorable Charles Francis Adams, Secretary of the Navy, who in the name of the President extended to the International Astronomical Union a most cordial welcome to the United States. He also, in a few appropriately chosen words, referred to those activities in the Navy to which astronomy not only contributed but for the success of which astronomy was indispensable. Dr. Bernice V. Brown, dean of Radcliffe College, then was presented by Dr. Shapley. Miss Brown very graciously extended to the visitors the beauty, the comforts, and the hospitality of Radcliffe College. She remarked that, whereas the

students coming to college often come with rose-colored glasses, she had noticed that the astronomers had brought with them smoked glasses. Following Dean Brown's remarks, Dr. Shapley assured the group that the doors of the Harvard College Observatory would swing open at their approach and that the Observatory would belong to them during the session.

At this time Sir Frank Dyson, Astronomer Royal of Great Britain and President of the International Astronomical Union, assumed the chairmanship and very fittingly responded in the name of the guests to the several expressions of warm cordiality. After this, greetings from Dr. George E. Hale, honorary director of Mount Wilson Observatory, Dr. Paul Guthnick, director of Neubabelsberg Observatory, and Dr. Max Wolf, director of the Königstuhl Observatory, were brought to the assembly and warmly received. The audience then stood while the names, twenty in number, of those who had died since the assembly in Leyden, were read and while brief mention of great loss which the I.A.U. had sustained was made. Dr. A. Kopff then spoke briefly in German bringing assurance of genuine coöperation on the part of his colleagues in Germany in the projects of the Union; it was announced that the Vatican State had been added to the Union; the secretary was authorized to send messages of greeting and good cheer to the former presidents of the Union, who were still living, and also to Professor Max Wolf, who at that time was very ill; a few matters of business were attended to, and the session was well started.

Before the session, draft reports prepared by the chairmen of the several commissions had been printed and circulated. They formed the basis for discussion when the several commissions assembled. These reports adopted as presented, or modified by the commissions, constitute the technical and scientific results of the session. They will be published and circulated later so that no attempt will be made here to indicate the extent of them as they themselves will constitute a volume of considerable size.

Aside from the work of the commissions a number of events were arranged for the enjoyment of those present. Very much benefit is derived from informal conversation by persons who are working along the same lines but oftentimes in widely separated places. Opportunity for such conversation was afforded on the many different occasions.

On Friday evening, September 2, a reception was tendered to the International Astronomical Union by the American Astronomical Society. The place selected for this occasion was the garden court of the Lowell House of Harvard University. The guests were permitted to enjoy the beauty of the garden and to inspect the Lowell House as well. President A. Lawrence Lowell of Harvard University graciously returned from a vacation to explain, informally, to the group which had assembled there the plan of student dormitory life which had recently been instituted at Harvard University and of which Lowell House was

typical. This proved to be a very interesting and enlightening feature of the evening. Following this delicious refreshments were served in the garden and everyone felt that nothing had been left undone to make the evening a most enjoyable one.

On Saturday afternoon, September 3, a special opportunity was given to visit the Harvard Observatory. Because of the large part this observatory has played in the development of astronomy during the last three-quarters of a century, it was a matter of great interest to see the buildings and equipment of this historic institution. Of especial interest was the new building, recently completed, for the purpose of storing the enormous number of photographic plates which have been accumulating, and of furnishing offices and computing rooms for the members of the staff. After a tour of the buildings the guests were escorted through the director's residence to the veranda adjacent to the gardens where the director, Dr. Harlow Shapley, and Mrs. Shapley entertained a large group at a delightful garden party. Many old acquaintances were renewed and new ones formed in this favorable setting. Many cameras and many tongues clicked simultaneously.

On Sunday afternoon, September 4, a pilgrimage was made to Oak Ridge Station of the Harvard College Observatory. This new station now nearly completed is located near the town of Harvard some 29 miles from Cambridge. The principal instrument of this station will be a 61-inch reflecting telescope. The corner stone of the building which is to house this instrument was laid upon this occasion, Sir Frank Dyson officiating. Other instruments including a sky patrol, seismograph, and a laboratory will make this station a completely equipped observatory.

A bountiful picnic supper was served in the grove adjacent to the observatory buildings after which the party returned to Cambridge, some by special buses and some by private automobiles, the astronomers realizing that they had that day visited what doubtless is destined to become an important astronomical center of the near future.

On Monday evening, September 5, the members and guests were invited to visit the Jefferson Physics Laboratory and the Physics Research Laboratory of Harvard University where special work then in progress was explained. An alternative program for the evening was the presentation of motion pictures at the Institute of Geographical Exploration in the new and most elegantly appointed School of Geography. The group was delightfully entertained with motion pictures showing the development of the sugar cane industry in Cuba, with photographs of undersea life, with photographs of icebergs, and finally, with photographs, and a graphic description by Mr. Weld Arnold, of the eclipse expedition to the Island of Niuafoou in October, 1930.

On Tuesday, September 6, a special boat conveyed the group from Boston to Plymouth. After dinner at Plymouth and a hasty view of the Plymouth Rock, the party returned by boat to Boston and thence to

Cambridge by special buses. The weather was exceedingly favorable for this excursion and everyone felt it to have been a most pleasant journey.

The event which in the minds of many was the climax of the week was the lecture by Sir Arthur Eddington at the Massachusetts Institute of Technology on Wednesday evening, September 7. The topic of the lecture "The Expanding Universe," being concerned with the most recent advances in astronomical thought, attracted a very large number of hearers. Admission was by ticket only, but long before the hour scheduled for the lecture the audience room, accommodating 1400 persons, was completely filled and it was necessary to carry the address by means of a microphone and loud speaker to an adjacent room so that all who wished might hear the address. It was an unusual privilege to hear so able a speaker presenting ideas which he himself had so large a part in formulating.

On Thursday afternoon, September 8, an excursion was made by automobiles and buses to Wellesley College. This was at the invitation of the trustees of Wellesley College and Professor J. C. Duncan. After a hasty visit to Whitin Observatory of Wellesley College the group was cordially received in one of the large halls by Miss Ellen F. Pendleton, president, and Mr. and Mrs. Duncan. The party returned to Cambridge in the evening and at 7:30 convened in the large dining-room of the Hotel Continental for the special dinner. After the dinner, Professor Henry N. Russell presided as toastmaster and called upon Sir Frank Dyson of Greenwich, Professor L. Esclangon of the Observatory of Paris, Professor and Mrs. Abetti of Arcetri Observatory, Florence, Italy, Mr. R. M. Russell, mayor of Cambridge, Professor W. S. Adams of Mt. Wilson Observatory, and Professor Harlow Shapley of Harvard College Observatory.

For the sake of the ladies in attendance, for whom the meetings of the scientific commissions might not be of absorbing interest, the local committee had arranged two special features. The first on Monday afternoon consisted of a ride upon the Charles River followed by tea at the home of Professor and Mrs. Kennelly. The second on Wednesday afternoon consisted of visits to the University Museum, the Germanic Museum, and the Fogg Art Museum of Harvard University, followed by tea at the Faculty Club.

The second general meeting of the members was held on Thursday morning. At this meeting the reports of the chairmen of the several commissions, some thirty in number, were heard and adopted.

The final meeting was held on Friday morning. At this time it was decided that Paris should be the place of the next meeting of the I.A.U., to be held early in July in 1935. This was at the invitation of Professor Esclangon. It was at first proposed to hold the meeting in 1936 before or after the eclipse of that year which will occur on June 19 and be visible in Greece, Asia, Japan, and southern Siberia. By vote of the

body, 1935 was favored and Professor Esclangon accepted this proposal.

Professor Frank Schlesinger of the Yale Observatory was chosen next president of the Union and the vice-presidents are Professor Banachiewicz, Professor Fabry, Professor Nörlund, Professor Bianchi, and Professor Nusl. Professor Stratton was re-elected as general secretary.

Addresses of appreciation were made in French and English by President Sir Frank Dyson, Professor Esclangon, Professor Nörlund, and Lady Dyson, the latter on behalf of the ladies.

Announcement was made of the personnel of the new commissions. A comparison of this with the report published previously will show the changes made. Professor Russell stated that the omission of names formerly on commissions did not necessarily mean that it was the intention to drop such members from the Union. Members may be elected to the Union by the National Committees and also others besides those mentioned in the printed list can be co-opted as desired.

The chairmen of the respective committees connected with the session were: Reception, B. J. Bok; Registration, L. B. Andrews; Bursar, W. J. Fisher; Housing, F. L. Whipple; Excursions, L. Campbell; Information, B. J. Bok; Press, C. H. Payne; Women's Committee, Mrs. Harlow Shapley. Harlow Shapley was chairman of the Local Committee and L. B. Andrews, secretary.

All of these persons deserve much credit for the great care given to the arrangement of details and for the manner in which the schedule of events was carried out. No item which might contribute to the comfort or pleasure of the guests was overlooked. The fact that we are able to list here the names of all but three of the two hundred twenty persons appearing in the photograph (Plates VIII and IX) is an indication of the thoroughness and efficiency of the Harvard staff.

It need hardly be remarked that the numbers refer to the corresponding numbers in the key. The numbers associated with the children seated on the ground are, left to right, 129, 146, 171, 180, 194, 207, 213.

1.
2. Lindblad
3. Mrs. Van Biesbroeck
4. O'Connell
5. Van Biesbroeck
6. Mrs. Wood
7. Lindsay
8. Miss K. Williams
9. Miss Payne
10. W. H. Wright
11. Bok
12. Miss Furness
13. D. B. Pickering
14. Lockyer
15. Stein
16. Van de Kamp
17. Wilson
18. Olivier
19. Miss Lowater
20. Menzel
21. J. A. Miller
22. Hirayama
23. Campbell
24. Alden
25. Andrews
26. Kopff
27. Banachiewicz
28. Miss Allen
29. de Roy
30. Rodés
31. Witkowski
32. Wood
33. Dingle
34. Notsuki
35. Eckert
36. Mrs. Dingle
37. Mitchell
38. W. D. Lambert
39. Pettit
40. Fath
41. A. C. Lane
42. Schilt
43. Bovey
44. Whipple
45. St. John
46. Slocum
47. MacLaughlin
48. Carpenter
49. Steavenson
50. Stetson
51. Vyssotsky

52. Gerasimovic
53. Brouwer
54. Oort
55. Miss M. Mussells
56. Mrs. Vyssotsky
57. Jouaust
58. Leuschner
59. Comrie
60. Kovalenko
61. Mrs. Oort
62. Mrs. Schlesinger
63. H. Lane
64. Mrs. Stetson
65. Mrs. Mayall
66. Phillips
67. A. Lambert
68. Mrs. Roberts
69. Miss S. Mussells
70. Mrs. Stewart
71. D'Azambuja
72. Mrs. Burton
73. Heinrich
74. Danjon
75. Mrs. Armellini
76. Lagarde
77. Bianchi
78. Armellini
79. Jackson
80. Mrs. Duncan
81. Lampland
82. Mrs. Whittaker
83. Arnold
84. Esclangon
85. Miss Bosler
86. Whittaker
87. Mrs. Abetti
88. Mrs. Dugan
89. Mrs. Wilson
90. Mrs. Lampland
91. Hammond
92. Green
93. Schlesinger
94. Donitch
95. Mrs. Chretien
96.
97. Mrs. Kovalenko
98. Sollenberger
99. Morgan
100. Eichelberger
101. Dyson
102. Miss Chretien
103. Chretien
104. Silva
105. Miss Dugan
106. Miss Harwood
107. Duncan
108. Bowie
109. Robertson
110. Grouiller
111. Babcock
112. Dugan
113. Miss M. Williams
114. Miss Cannon
115. Pitman
116. Lindley
117. Nörlund
118. Stebbins
119. Castro
120. E. G. Williams
121. Horn d'Arturo
122. Niethammer
123. Mrs. Lindley
124. Abetti
125. Slipher
126. Lejay
127. Lefebre
128. Mrs. Lundmark
129. Master Van Biesbroeck
130. Stratton
131. da Costa Lobo
132. Butler
133. Dufay
134. Miss Popkavich
135. Carrasco
136. Miss Vinter-Hansen
137. Minnaert
138. Picart
139. Mrs. Boss
140. Miss Barney
141. Shapley
142. Fayet
143. Olcott
144. Carroll
145. Barnes
146. Miss Huffer
147. Russell
148. Boss
149. Miss Nörlund
150. Miss Wright
151. Holm
152. Mrs. Merrill
153. Mrs. Calder
154. Lemaitre
155. Miss Boyd
156. Calder
157. Hujer
158. Miss Moore
159. Mrs. Wintner
160. de la Baume Pluvinel
161. Stewart
162. Barbier
163. Thomas
164. Miss Swope
165. Merrill
166. Wintner
167. Hellweg
168. Slouka
169. Smiley
170. Redmond
171. Miss Meggers
172. Bosler
173. Knox-Shaw
174. Mrs. Horrocks
175. Horrocks
176. Boyd
177. F. D. Miller
178. Sitterly
179. Beals
180. Miss Stearns
181. Baillaud
182. Chant
183. Miss Gingrich
184. Harper
185. Hall
186. Miss Kluyver
187. Darling
188. W. H. Pickering
189. Bobrovnikoff
190. Miss Hughes
191. Mrs. Gingrich
192. Milham
193. Mrs. Rieke
194. Master Meggers
195. Brown
196. Mrs. Meggers
197. Gingrich
198. Meggers
199. Stokley
200. Struve
201. Miss Douglass
202. Baker
203. Miss Olmsted
204. Mrs. Baker
205. Adams
206. Burton
207. Master Meggers
208. Plaskett
209. Dnebrowski
210.
211. Mrs. Lee
212. Lee
213. Master Stearns
214. Eddington
215. Mrs. Millman
216. Brigham
217. Hertzsprung
218. Millman
219. Mrs. Stearns
220. Stearns

At noon on Friday the official session of the I.A.U. was over. Some of those who had come long distances and whose interests and work are concerned with the problems related to the organization of the

Galaxy and of the universe remained, at the invitation of Professor Shapley, for a conference on matters of common interest. The others returned by boat, by train, by automobile to their homes, carrying with them new inspiration for their work and many pleasant recollections of the events of the week.

The Forty-Eighth Meeting of the American Astronomical Society

The 48th meeting of the A.A.S. was held on September 2. On account of the scientific program of the I.A.U. which was to follow, no papers were given. The Council met in the morning at the Observatory, accepted the audited accounts of the secretary and treasurer, elected eight new members of the Society and transacted other necessary business. The number of members of the Society is now 532.

The annual business meeting of the Society, attended by about 47 members, was held in the afternoon at Alice Longfellow Hall of Radcliffe College. Members of Council newly elected are Benjamin Boss, vice-president; R. S. Dugan, secretary; F. C. Jordan, treasurer; Harriet W. Bigelow, D. W. Morehouse, Otto Struve, and F. R. Moulton, councilors; J. A. Miller, member of the National Research Council.

Annie J. Cannon, A. O. Leuschner, and C. P. Olivier were elected as a committee to present nominations for the next election.

The Society was host to the I.A.U. at a reception in the evening at the Lowell House.

RAYMOND S. DUGAN, *Secretary.*

Eclipse Reports

AUGUST 31, 1932

The long and eagerly anticipated eclipse of August 31 is now a thing of the past. As was to be expected in the case of an eclipse so easy of access, the path of totality in Canada and the New England states fairly bristled with eclipse camps. Even outside the path of totality, throughout the entire United States, the people were eclipse conscious, and smoked glass, or some more modern and more convenient device, was called into use, for the purpose of looking at the partially eclipsed sun, to a greater extent, no doubt, than ever before.

Through the generous coöperation of those in charge of the expeditions, we are able to present here more than a score of reports, all of great interest. Others which were not received in time will appear in the next issue. More extensive reports will be published later in those cases in which the clouds were kind.

Expedition of the Adler Planetarium and Astronomical Museum, Island Pond, Vermont

The eclipse expedition of the Adler Planetarium and Astronomical Museum was made possible through a special appropriation by the South Park Commissioners.

The site of Island Pond, Vermont, was chosen in furtherance of the advantageous policy of distributing the observing stations along the shadow path. We were approximately midway between the Sproul Observatory site at Derby and that of the Mt. Wilson Observatory at Lancaster. Seldom, if ever, has there been so favorable distribution of observing parties along the path of totality.

The Yerkes Observatory, Elgin Observatory, Drake University, and Chicago Daily News participated in the expedition and camp activities. The Yerkes Observatory with Messrs. Van Arnam and Sullivan set up an equatorial motor-driven mounting carrying a telescope with UV lens for photographing the corona in light of different colors, and a 6-inch reflector with objective prisms for the flash spectrum. Mr. Frank Urie of the Elgin Observatory set up radio apparatus for reception of time signals from the experimental radio transmission station of the Elgin Observatory. His chronometers provided accurate time. Also he used a 6-inch telescope for determination of time of contacts. Dr. D. W. Morehouse of Drake University brought to the camp a 5-inch lens of 10-foot focal length for photography of the corona. The Planetarium installed: (1) For photography of the corona a horizontal telescope of 6 inches aperture, 20 feet focal length, fed by a motor-driven coelostat bearing a 10-inch pyrex mirror. This was to be operated by Mr. Bertrand Fox of Harvard University and Miss Maude Bennot. (2) A motion picture camera with a 4-inch telescope 53 inches focal length and 18° objective prism for multiple exposures on the flash spectrum with the view toward determination of the depths of the strata of the reversing layer. The Universal camera was modified so that a small image of a sweep-second watch face could be photographed in the corner of each frame. A second coelostat with an 8-inch pyrex mirror provided light for this instrument and also for the Drake coronograph. Fig. 1 shows the instrument with coelostats to the right, with part of the 20-foot horizontal telescope, and in the background a surveyor's transit, Mr. Sullivan near the Yerkes instruments, and the village. (3) Two portable telescopes, one with objective prism the other with an objective transmission grating were to be used by Professor Walter Bartky of the University of Chicago and Mr. F. W. Schlesinger of the Planetarium, for visual determinations of duration of visibility of certain lines of the spectrum. Two chronographs were available for their records. (4) Finally, an equatorial head carrying two motion picture cameras—a 6-inch operated by Mr. Albert Krause of the Planetarium, a 20-inch by Mr. Irving Smith of the Daily News—and a guiding telescope operated by Mr. Ralph Mansfield completed the installation. Concrete piers were set; instruments were installed and adjusted; electric circuits provided. The routine had been practiced, with Professor W. R. Ransom of Tufts College calling seconds marked by an Elgin chronometer. Little remained in the matter of preparation.

Eclipse morning dawned clear but clouds soon covered the sky and remained unbroken until noon. At that time Miss Maude Bennot and Professor Henry Crew who had flown from Chicago in the private airplane of Mr. George Horton arrived with their host and pilot. At about the time of first contact the clouds thinned and a glimpse of the indented sun was obtained. As the prospects seemed very unfavorable, I urged the flying squad to return to their airplane and take to the air. They had a fast ride across the darkening country-side and a steep climb in their plane to an elevation above our cloud ceiling. Their successful view and thrilling experience was the most gratifying feature of our expedition, even though when they left the camp one had the feelings of a captain of a sinking ship seeing the last lifeboat safely away.

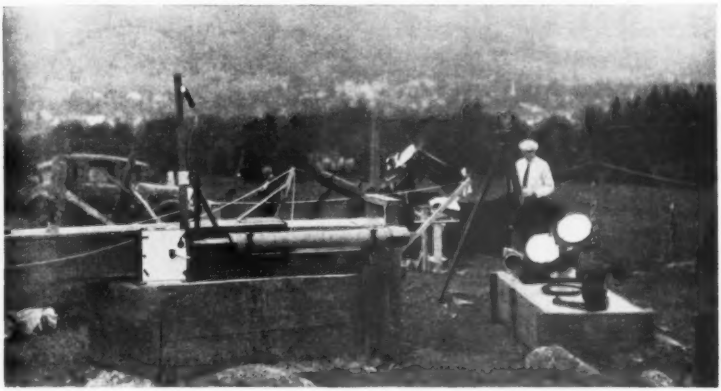


FIG. 1. INSTALLATION AT ISLAND POND, VERMONT.

At the camp the sun appeared through a thin spot in the clouds about thirty-five seconds before the moment of the second contact, a thin silvery crescent. It narrowed rapidly and disappeared without showing the usual Baily's Beads. According to preliminary computations the second contact was late. Mr. Urie's observations provide a sharp determination of the moment. The approach of the shadow on the cloud ceiling and over the distant landscape was seen, though its edge was not well defined. The following edge of the shadow seemed more sharply cut, the approach of light across the landscape swift and well marked. The darkness during totality was not profound, a watch face was easily read, faces could be recognized at a distance, darkness about like that during a heavy thunder storm or that usually accompanying a hail storm.

No trace of the flash spectrum or of the corona was visible nor do they appear on any of the plates. Plates by Dr. Morehouse show the crescents near the contact times. The last exposure with our coronagraph ran an instant beyond third contact and shows the crescent broken and irregular. The films from the motion picture cameras are

not yet available for examination but nothing of value is expected from them.

I wish to express my appreciation of the coöperation of the various observatory groups who participated in the Island Pond Camp, to the South Park Commissioners for their generous subvention, to the Chicago Daily News for provision of the truck for transportation for our instruments, to various companies who loaned equipment, Buff and Buff, Eastman Kodak Stores Co., Gaertner Scientific Co., Northwestern University, and Mr. Robert J. Casey, and to all at Island Pond who received us with such kindly hospitality, especially to Mr. P. A. Bartlett, Postmaster, who responded with preliminary information; to Mr. and Mrs. C. J. Cross who ministered to our comfort; and to Mr. John Hinton who permitted us free use of a superb site on a corner of an upland pasture, overlooking the Pond and village and a wide expanse of valleys and mountains.

PHILIP FOX.

BOWDOIN COLLEGE OBSERVATORY

Bowdoin College in Brunswick, Maine, is about forty-five miles from the center of the eclipse path. It possesses a small observatory with only very modest equipment. After learning of the numerous well-equipped expeditions which were to observe the clipse, it seemed almost useless to try to do what would be done better in the center of the path. However, a consideration of the fact that Bowdoin was a good many miles from most of the other observers and might have different weather led to the conclusion that it would be worth while to try to photograph the eclipse in Brunswick. Consequently the day of the eclipse found several groups of observers awaiting the event.

On the campus of the college C. C. Hutchins, professor emeritus, assisted by Ralph Derby photographed the eclipsed sun through a lens of three and one-half inches aperture and of ten feet focal length. The camera tube and its equatorial mounting were built of wood except for the polar axis which was a long steel shaft. At the upper end of the polar axis a lever was firmly attached. The other end of this lever-arm carried a half-nut bearing against a threaded rod which was turned by a telechron motor. This arrangement was found very satisfactory, the camera following the sun faithfully. The blue focus of the lens was used, having been found visually by means of a cobalt glass filter and a ground-glass. Eastmas 40 plates (4x5), backed the day before the eclipse, were used and four photographs taken ranging in exposure time from two seconds to twenty seconds. The first three of these were successful but the last was spoiled by the unexpected appearance of the sun.

In the college observatory the writer, assisted by Mrs. Coburn, took photographs with the equatorial telescope. This telescope has a 6-inch Wray lens of 100-inch focal length, and is driven by a clock and falling weight. Since the telescope had previously been used solely for visual purposes, considerable work had to be done on it to convert it into a camera. The position of the blue focus of the objective was found by photographing star trails in the usual way. For photographing the eclipse the objective was stopped down to four inches. Eastman 40

plates (4x5) backed with Eastman opaque were used and four exposures were made of one second, three seconds, ten seconds, and twenty-five seconds respectively. The last exposure was ruined by the emerging sun, totality failing to last as long as was expected. The first two plates show the inner corona and prominences well. On the third plate, the longest streamer of the corona can be traced to the very edge of the plate, a distance of one and one-fourth diameters of the moon. The streamers on the other side of the sun do not extend as far; the narrow one sending rays out to three-fourths the diameter of the moon, while the broad one reaches a distance of five-eights of a diameter. The polar rays are well defined. (Plate XI.)

An attempt to photograph the flash spectrum and the spectrum of the corona was made by Marcel L'Heureux, J. C. Roper, and B. D. Wright. The spectrograph was the objective prism type having a sixty-degree prism and an objective of three and one-half inches aperture and twenty inches in focal length. The camera and mounting were designed and built by George Pottle, who unfortunately was prevented from using them by a serious accident the night before the eclipse. Wratten Hypersensitive Panchromatic plates were used for the exposures. The results from this instrument were only partially successful. The first flash was lost. A number of lines were found in the spectrum of the corona and a few in the last flash. These lines have not yet been identified.

Professor N. C. Little tried to time the contacts by means of a battery of thirteen Weston photronic cells. These cells were mounted on a heliostat placed on a platform on the top of a high building. They were connected to a sensitive galvanometer and balanced by a potentiometer. These cells really indicated the brightness of the southwestern sky as well as the brightness of the sun. This arrangement could not be expected to furnish any information about the first contact. During the first part of the partial phase of the eclipse it was easy to balance the circuit at definite times and get a reading that indicated the brightness of the sun and neighboring sky. However, as totality drew near, the light diminished so rapidly that it was found impossible to keep the circuit balanced and get potentiometer readings. It seems very probable that some modifications of the method would enable one to time the second and third contacts even more accurately than the rough edge of the moon warrants.

Harry Werler and Charles Pierce of the Blue Hills Observatory set up a temporary meteorological station to study the effect of the eclipse on air currents. Their observations extended twenty-four hours each side of the eclipse time. Surface air currents were observed by self-recording direction and velocity measuring instruments. Watching the ascent of pilot balloons through a theodolite gave information concerning upper air currents. The Blue Hills Observatory will probably publish an account of their findings.

Radio conditions during the eclipse were studied by "listening in" on a twenty-meter wave. The listeners reported less static and the reception of more distant stations during totality than either before or after the sun was entirely hidden. This part of the work was carried on by

Ralph Buckley, Edwin Tracy, and Mr. Newell.

Although some of the observations were not very successful, enough good results were obtained to make all the work worth while. In the matter of weather the Bowdoin observers were highly favored. The sky was almost entirely free of clouds; there being none whatever in the vicinity of the sun throughout the whole eclipse.

Brunswick, Maine, September 9, 1932. HAROLD COBURN.

CINCINNATI OBSERVATORY

The position of our Eclipse Camp at North Stratford, New Hampshire, was very accurately obtained from a topographical survey base, less than 500 feet away. It was: latitude = 44° 45′ 06″, longitude = 71° 37′ 38″. The clouds, however, spoiled our plans: at first contact I could not see the indentation of the limb of the sun, though I used the full aperture of the 4-inch without shade glasses. Our plan to photograph the partially eclipsed sun at regular intervals was abandoned, and we took exposures whenever the clouds thinned out. During totality it continued cloudy; an exposure of twenty-five seconds shows prominences and a narrow border of the inner corona about a dark center. The times of second and third contact were within a second of the times, computed with the corrections supplied by the *American Ephemeris*. The corrections to last contact, observed by Dr. Smith and myself were, respectively, —4ˢ and —3ˢ. Our party consisted of Dr. Smith, Mr. Herget, and myself from the observatory, Professor Anderson of Miami University, with Miss Sanders, Miss Harriet Smith, Mr. Paul Farnsworth, and Mr. Bert Lugannani to assist. The general interest was sufficient to bring forty residents of Cincinnati and vicinity to our camp on eclipse day. These found the spectacle well worth the journey. The chickens went to roost, animals behaved as though it were night; a pronounced chill in temperature occurred, darkness and peculiar atmospheric colors were evident, and the phases occurred as predicted. The gradual covering of the sun's disc could be followed and even a narrow corona was visible through the thin clouds. Mr. Frederick and party from the Eastman Kodak Company took moving pictures whenever the clouds were very thin. He had a 4-inch lens of 24-inch focus, and should have obtained larger images than usually taken. I have not yet seen his results.

EVERETT I. YOWELL.

THE CORNELL ECLIPSE EXPEDITION

In early June, 1932, Mr. Robley C. Williams, a graduate student in physics and astronomy at Cornell University, discovered how to coat chromium on optical surfaces, so it was decided to attempt to photograph the ultra-violet spectrum of the corona. The physics department kindly loaned us two Hilger ultra-violet spectrographs and a 10-inch concave mirror, having a focal length of 80 inches, besides minor equipment for obtaining the iron comparison spectrum on the plates with the coronal spectrum.

The Lowell Observatory loaned us a 15-inch concave mirror having

a focal length of 12 inches.

The 10-inch and the 15-inch mirrors were chromium coated by the process mentioned in the opening paragraph.

Besides the equipment of spectrographs and mirrors, with which to attempt to get the ultra-violet spectrum of the corona, the astronomy department supplied an equatorial mounting which carried a 4-inch refractor provided with camera for direct photographs of the corona and a smaller telescope and camera with Nicol prism attachment to study the polarization of the coronal light.

Since our expedition had two ultra-violet spectrographs, we decided to divide into two parties. One party with Hilger ultra-violet spectrograph, the 10-inch chromium covered mirror, the 4-inch telescope with camera, and telescope camera with Nicol prism, located at the school house at North Conway, New Hampshire. This party consisted of Miss B. E. Meyers, Mr. R. W. Shaw, and Mr. George Sabine, of the Department of Physics, and Prof. G. H. Sabine of the Department of Philosophy. This party was in charge of Mr. R. W. Shaw.

The other party with the other Hilger ultra-violet spectrograph and the Lowell 15-inch mirror went to Newport, Vermont, where they located on the grounds of the Newport Country Club. The party consisted of Mrs. Robley C. Williams and Mr. Robley C. Williams of the Department of Physics and Astronomy and Prof. S. L. Boothroyd and was in charge of Professor Boothroyd.

Each party motored to its destination without mishap to any of the delicate equipment and had enough clear weather to make the necessary adjustments of instruments.

At North Conway, New Hampshire, the clouds prevented getting any results, though the observing program was completely and precisely carried out.

At Newport, Vermont, the sky cleared where the sun was ten minutes before totality and remained so until totality commenced, when thin clouds intervened during totality, and two minutes after third contact the sun was completely obscured until long after fourth contact.

The spectrogram secured at Newport shows a faint continuous spectrum of the corona with seven emission lines from about λ 4000 to λ 3700. The iron comparison spectrum exposed three minutes before totality is very good.

The spectrogram has not yet been measured.

S. L. Boothroyd, R. W. Shaw, R. C. Williams, George Sabine.

Dearborn Observatory

At the Northwestern University eclipse station, three miles northeast of Fryeburg, Maine, the sky was clear for first contact and for fifteen minutes thereafter. A heavy cloud then obscured the sun until a few minutes before second contact, at which time a thin patch of cirrus crept over the sun but not sufficiently heavy to seriously obscure it. The third contact was well seen. The succeeding partial phases were increasingly obscured by heavy masses of cirrus and flocculi-like clouds.

The program of aerologic observations was carried out substantially

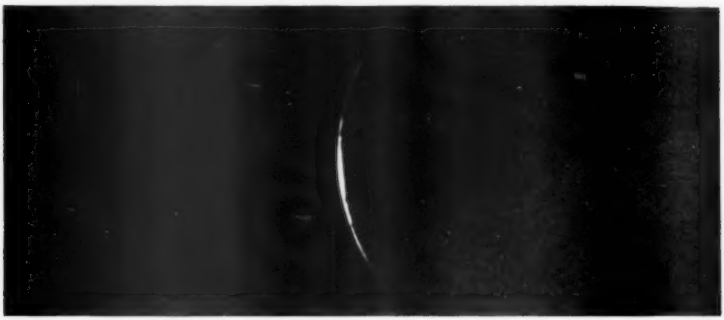
as planned. It is expected that a definitive conclusion about the effect of the atmospheric refraction on Einstein deflection plates will be afforded by these observations. The definitive evaluation of our results will naturally take some time.

The program of motion pictures of the spectacle was seriously interfered with by the clouds.

OLIVER J. LEE.

DRAKE UNIVERSITY OBSERVATORY

I am sending you, under separate cover, prints of the second and third contacts. I think they are rather unique. Through an opening in the clouds I succeeded in photographing Baily's Beads at both these contacts. Of course, in the original negatives they are even more distinct than they are in the prints. The point of interest is the fact that both contacts were caught at practically the same phase.



BEGINNING OF TOTALITY. BAILY'S BEADS.

Due to the extreme cloudiness, it was difficult to determine the exact instant of the beginning of totality. I exposed my first plate when the timer started the count. You can see clearly from the photograph that this must have been at least a second too soon. I exposed a plate during totality, but there was absolutely nothing on it. The third plate was exposed for ten seconds, and I closed the camera on the 98th count. It is evident that this was at least one second too late.

The eclipse at Island Pond was a grand spectacle, but was most tantalizing to the astronomer. Through the broken clouds we could see the clear, deep blue sky, and how we longed for an opportunity to test our well prepared schedule. Dr. Fox, director of the Adler Planetarium, had a unique program which was ably supplemented by the special equipment from Yerkes Observatory under the direction of Dr. Van Arnam and Mr. Sullivan and the excellent time service from the Elgin Watch Company furnished by Dr. Urie.

The setting of Island Pond added to the grandeur of the spectacle. The shadow did not approach with the suddenness that we had anticipated. In this respect it was distinctly different from the approach of the shadow at Southport, England, in 1927. It appeared as an expand-

ing cloud engulfing the little village nestled between the hills and bordered by the beautiful lake with its central island. The unexpected appearance of the thin crescent of the sun just before totality added to the excitement of the camp. The crescent disappeared, however, as quickly as it appeared. The expedition then settled down to observing the less scientific phenomena such as the appearance of the landscape, the behavior of birds and animals, and, most interesting of all, the attitude and behavior of the town's people.

The ending of totality was the most spectacular moment. The shadow disappeared with the suddenness that we had expected at its appearance. The thin crescent of the sun appeared through the broken clouds and was truly awe inspiring. One has more patience with the superstitions of the ancients after having had this unusual experience. The facial expressions and conversations of the observers after totality were extraordinary mixtures of disappointment, awe, and pleasure. The phenomena for which they had been prepared did not appear, but the spectacle was so unlike that which they had anticipated that the final results were probably equal to their anticipations.

The inhabitants of this little mountain village did themselves proud in their hospitality, keen interest, and unselfish coöperation.

September 10, 1932. D. W. Morehouse.

The Eclipse from Above the Clouds

Piloted by Casey Jones, veteran aviator, and Paula Lind, who is a pilot in her own right, and accompanied by Leopold Godowsky, pianist and composer, I flew up above the clouds and observed the eclipse and photographed the shadow of the moon on the clouds below.

More than an hour and a half before totality, we took off from the Portland, Maine, Airport, where the sky was clear and where it remained clear throughout the eclipse. We headed northwest over Lake Sebago toward banks of substantial cumulus clouds, which had been hanging in that direction since noon. Forty or fifty miles northwest of Portland we encountered the clouds, and found them to be 7,000 or 8,000 feet high,—all at this level if we neglect a few wisps of cirrus clouds scattered about which did not in any way interfere with our observation of the eclipse.

The farther we traveled toward the northwest, the more continuous became the layer of clouds, that is, the less openings there were. It was fortunate for our attempt to photograph the on-coming shadow of the moon that this immense blanket of clouds, over which we flew for miles, was level,—billowy, but all at the same level on top. We climbed on up to an altitude of 16,000 feet, from which height I thought I could see more than one hundred miles to the northwest from whence the shadow would come. From our vantage point the White Mountains seemed to be completely covered by clouds. Not even the peak of Mt. Washington was to be seen.

The beauty of this sea of clouds,—white at first in the bright sunshine, but becoming tinted with various colors as the sunlight waned,—was beyond description, and called forth enthusiastic exclamations from

us all. During totality the bright orange-yellow band just above the horizon all around the bowl of the sky seemed to lend its colors to the billows of this nebulous sea. The sight of the clouds alone, under the varying conditions, would have fully justified the trip.

I made several successful still-photographs of the partial phases of the eclipse with panchromatic plates, using the special Eastman filter, which was said to admit about one one-thousandth of the visible light.

We were surprised to see Venus several minutes before totality, as it shone brilliantly low in the western sky. During totality Jupiter was seen about 5° northwest of the sun. But our party did not see Mercury, or Regulus, or Spica, or any first magnitude star. Our observations were made, however, with the naked eye.

The thing we set out most determined to do was to photograph the oncoming shadow of the moon, since this had never been done before. The shadow of the moon was first seen, just a little before totality, as a narrow band on this level sea of clouds, at a distance of probably more than one hundred miles. As it approached it became less distinct, less definite. I began cranking the camera as soon as I was sure I could see the shadow and, with the camera pointed downward toward the clouds, cranked clear through until I observed the first "diamond-ring" effect and the flashing out of the corona. Then I was sure that the shadow had passed.

I used a standard Akeley motion picture camera with supersensitive panchromatic film, and a very rapid lens, f.1.9, wide open. The focal-plane shutter of the Akeley is open about 240 degrees out of the 360, and this makes it the most efficient shutter on any motion picture camera.

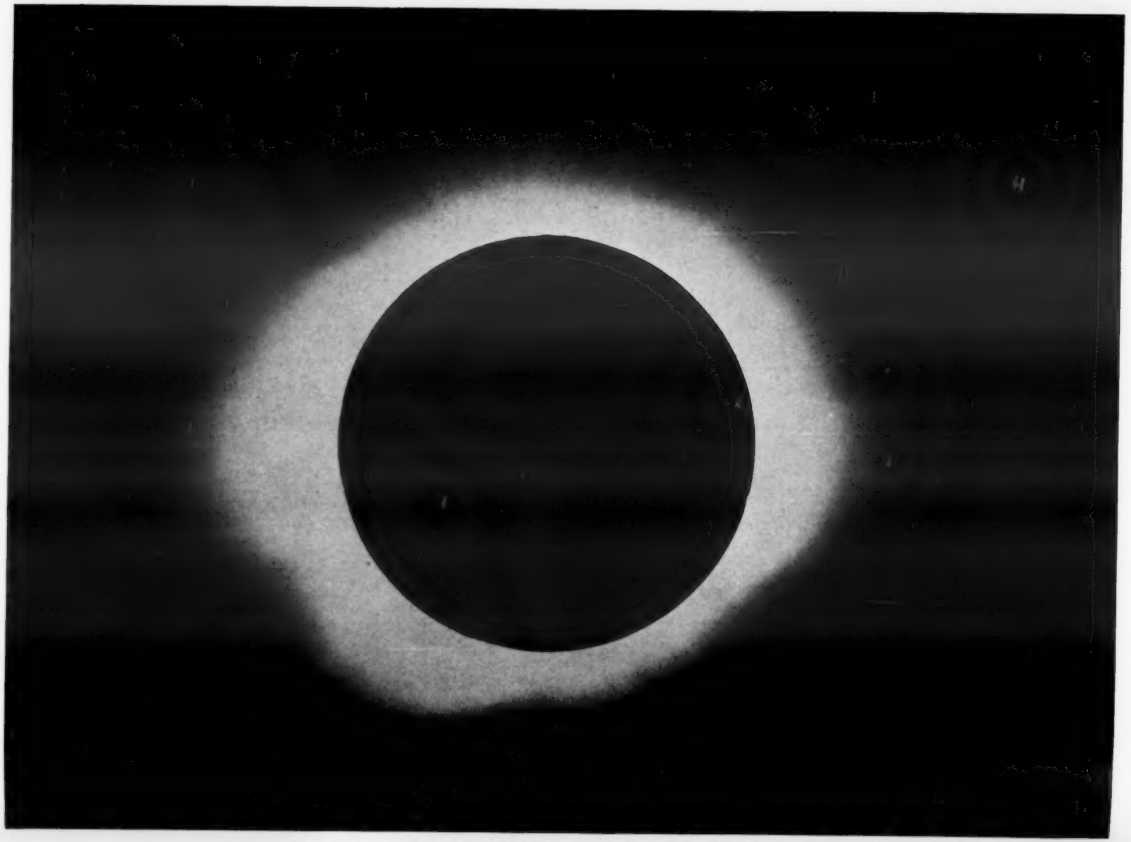
Upon development the picture seems to be well timed, as was expected with this equipment, and it shows just enough diminution of light to indicate the passing of the moon's shadow. However, no edge is to be seen in the pictures, and none was seen in our observation. According to the press, the U. S. Naval Observatory expedition reported, "The moon's shadow had no definite edge. The effect was a gradual darkening of the landscape beneath the plane until the time of totality, and then a gradual brightening after totality." Our observations were in exact accord with these. This raises the question whether the photographs of the moon's shadow, which have been published in the newspapers since the eclipse, had not been "stepped up" in contrast. Possibly the greater altitude would account for the difference.

I was somewhat prepared for these results by the experience of Casey Jones and an observer during the total eclipse of 1925, when they flew over the southern part of the totality belt in order to locate accurately the southern edge of the shadow in New York City. With a perfectly clear sky and a background of snow on January 24, 1925, Casey Jones and his companion were unable to see any edge to the shadow.

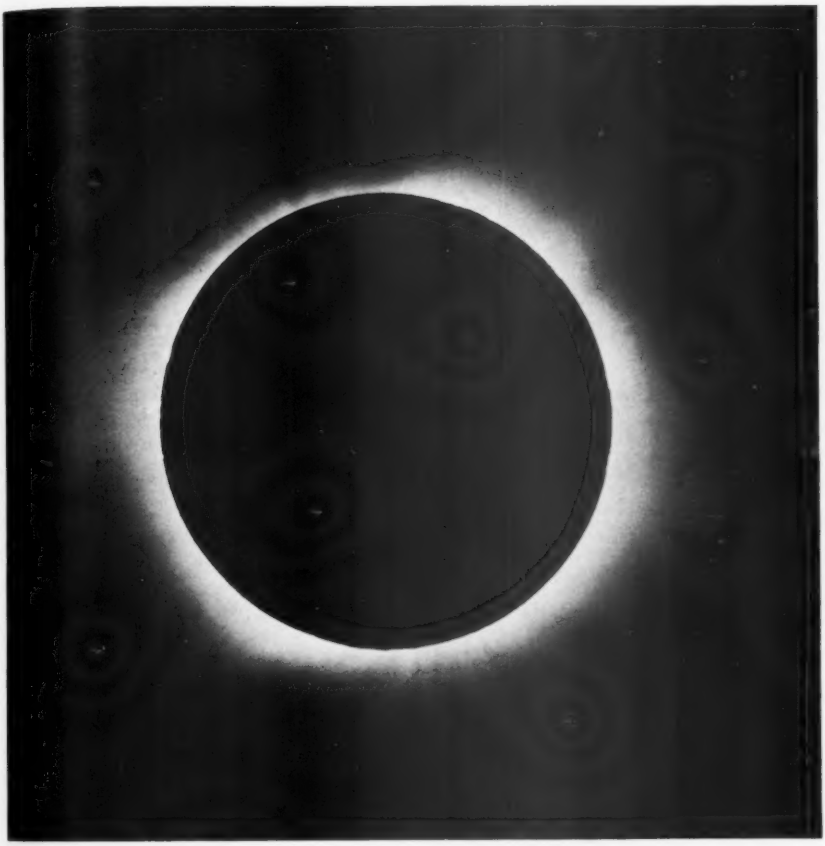
During the approach of the shadow, Miss Lind used the Graflex camera, with f.4.5 lens, wide open, using the new Ilford Hypersensitive Panchromatic plates whose speed is H. & D. 4,000 to yellow light,—the fastest plates on the market.

We had a perfect opportunity to observe the phenomenon, and to

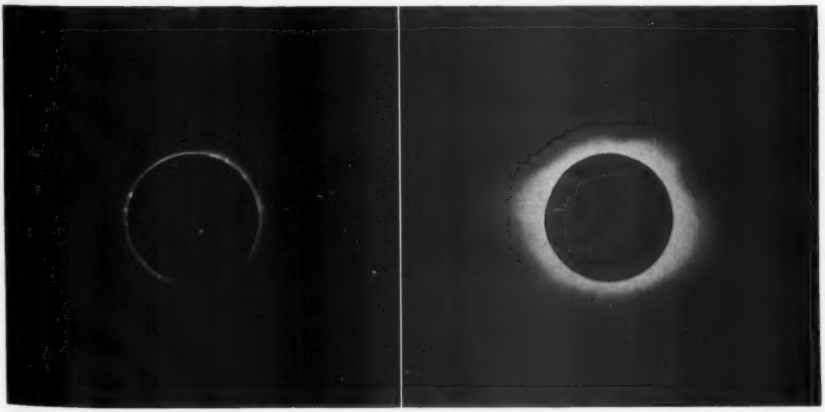
PLATE X



CORONA. CAMERA, 40-FOOT. EXPOSURE, 34 SECONDS.



A 10-second Exposure with the 25-foot Camera of the Van Vleck Observatory Eclipse Expedition.



Exposure, 3 seconds. Focal Length, 100 inches. Exposure, 10 seconds.
Bowdoin College, August 31, 1932.

Corona. Camera, 40-foot. Exposure, 34 seconds.

see a total eclipse of the sun from above a continuous blanket of clouds, with no earth visible below, is an unforgettable experience. This most impressive spectacle, seen under these conditions, makes one realize the inadequacy of words.

CLYDE FISHER.
Curator of Astronomy, American Museum of Natural History.

FRANKLIN INSTITUTE

Despite heavy clouds at the time of totality, the Eclipse Expedition of the Franklin Institute, Philadelphia, to Conway, New Hampshire, carried out its entire observing program, but no results of scientific significance were obtained. At the lens of the 85-foot focus coelostat camera was Dr. C. H. Gingrich, editor of POPULAR ASTRONOMY. Leonard Ormerod and James Stokley were in the darkroom, changing plates, each 20 inches by 24 inches in size. Performing similar duties for the 40-foot camera, which was also used to photograph the partial phases, were John S. Allen, of Colgate University, Dr. George Rosengarten, of the Philadelphia College of Pharmacy and Science, and I. M. Levitt. Cameras of 60-inch, 30-inch, and 23-inch focus, mounted on a polar axis, were operated by Howard Carl, Aldo Aldeghi, and David Auspitz, making exposures, and Harry B. Rumrill, Prof. W. H. Barton, of Pennsylvania Military College, and George Rosengarten, Jr., changing plates.

Attempts at color photography were made by J. W. Fecker, using a small equatorial telescope, electrically driven, and by L. V. D. Bucher, with a special stationary camera. Measurements of the radiation were made with pyrheliometers and thermocouples by Dr. Marion Eppley and his associates from the Eppley Laboratories, Newport, Rhode Island. Motion picture apparatus was operated by Phil Coolidge and other representatives of Paramount News. Russell W. Porter, with several assistants from the Amateur Telescope Makers, of Springfield, Vermont, attempted photography of the shadow bands, as did H. F. Balmer, of Toronto.

Charles Bittinger, of Washington, D. C., was prepared to paint the corona, with the assistance of Dr. Herbert E. Ives, of the Bell Telephone Laboratories. Dr. Ives also set up equipment for measuring the brightness of the eclipse, with a Weston photronic cell. During totality, readings were taken with this equipment by Dr. S. K. Brecht. Arthur Louis Sands, artist of Boston, Massachusetts, was prepared to sketch the corona. Photographs of the partial and total phases of the eclipse were also tried with a specially equipped Leica camera by Charles E. Bonine, associate director of the Franklin Institute Museum, in charge of engineering. Time was counted, through a microphone and loud speaker, by Prof. A. Clyde Schock, of the Philadelphia Central High School.

Though first contact and the early stages of the eclipse were plainly seen through light clouds, they increased in density until the sun was completely obscured at second contact. However, some of the plates of longest exposures showed faint traces of a ring of inner corona, and the radiometric measurements indicated a distinct reduction in radiation at

the time of totality. No shadow bands were observed.

The writer wishes to express his gratitude for the cordial coöperation displayed by the local authorities, who did all that was humanly possible to make the expedition a success. To assist in taking care of the crowds of visitors, two companies of the New Hampshire National Guard were encamped on a field adjoining that of the eclipse station. These men performed their duties with characteristic efficiency, especially in keeping unauthorized visitors from the field. It is hoped that no astronomical visitors were excluded, but if they were, it was entirely unintentional. Thanks should also be extended to Mr. Gustavus Wynne Cook, of Wynnewood, Pa., whose generosity made the expedition possible.

JAMES STOKLEY.

THE LADD OBSERVATORY

The party from Ladd Observatory, Brown University, observed the eclipse from Camp Katahdin, Sweden, Maine. They coöperated with the Polish astronomers, Professor Thadee Banachiewicz of the University of Cracow and Professor Joseph Witkowski of the University of Poznan whose station was located near Amesbury, Massachusetts. At each station was located a chrono-kinematograph with a 3-inch lens of 42 inches focal length, the times of the pictures being recorded on a chronograph. It was hoped to record very accurately the times of all four contacts and to improve our knowledge of the irregular outline of the moon's disk.

At Sweden, the first contact was successfully recorded and perhaps a part of the third. The other contacts were completely obscured by heavy clouds. At Amesbury, the Polish astronomers recorded very satisfactorily the important second and third contacts.

One plate was exposed in the 11-foot corona camera at Sweden with results more scenic than scientific. The Ladd Observatory party consisted of Professor and Mrs. C. H. Smiley and Mr. Paul Eberhart and was ably assisted by the following Rhode Island amateur astronomers: Rev. J. G. Crawford, Mr. E. R. Hager, and Mr. Franklin Huddy.

CHARLES H. SMILEY.

LEANDER MCCORMICK OBSERVATORY

At Magog in the province of Quebec, on the grounds of the Hermitage Country Club, there was assembled the largest collection of instruments ever gathered together in one spot for the observation of a total eclipse, 30 instruments in 4 expeditions being manned by more than 60 scientists. The largest single party was from Cambridge University under the leadership of Professor F. J. M. Stratton. The instrumental equipment is described in *Observatory*, **60**, 204, 1932. In addition, there were parties from McGill University, Montreal, from the University of Utrecht, Holland, and from the Leander McCormick Observatory; the assembled group therefore consisted of British, Canadian, Dutch, and American expeditions.

In addition to the spectroscopic work described in the preceding number of POPULAR ASTRONOMY, the Leander McCormick party had several

illumination meters kindly furnished by the Weston Electrical Illumination Corporation of Newark, New Jersey. A sensitive illuminometer of 16 cells was directed at the eclipsed sun. A cylindrical tube confined the measures to a diameter of ten degrees with the sun at the center. The measures and records were kept by a group of Cornell graduates assisted by John L. Coffey who had been with me on "Tin-Can Island" at the eclipse of 1930. A. H. Lamb of the Weston Company had charge of the recording instruments which made a complete record of the illumination of the north sky from before sunrise until after sunset. Mr. E. F. Weston, president of the company, gave personal supervision to the detailed arrangements.

The 4-inch concave grating was handled by Dr. H. A. Barton of the American Institute of Physics and by Professor A. C. G. Mitchell of New York University, the 6-inch grating by Professor F. K. Richtmyer of Cornell University and by his son, Robert Richtmyer. Three moving picture cameras were used by Mr. Hamilton McCormick-Goodhart of Washington, Mr. Kempton Adams of New York and Mr. Julian C. Smith of Montreal. Dr. W. H. Steavenson, Dr. W. E. Harper, and Miss J. M. Vinter-Hansen made visual observations.

The weather in the morning was very encouraging but clouds began to roll in about noon and steadily grew worse. At the time of totality there were a few clear patches, one in the zenith. We could see the crescent sun shortly before and soon after totality but during the total phase the clouds were too dense to permit any photographic work. In fact, the clouds were the densest I have ever experienced at any eclipse.

S. A. Mitchell.

The Lick Observatory-Crocker Eclipse Expedition

The observing station of the expedition was located on the athletic field of the Fryeburg Academy in the village of Fryeburg, Maine.

Although the observations during the total phase were obtained through thin cirrus clouds, the entire program as outlined on pages 390-391 of the August-September Popular Astronomy was carried out successfully. The coronal photographs and spectra of the corona, as well as the spectra of the chromosphere are excellent, and contain a wealth of material. The photographs of the flash spectrum obtained with the moving plate spectrographs appear to have been affected by the presence of the clouds to such an extent that their value for photometric studies is somewhat impaired.

The personnel of the party taking part in the observations on eclipse day consisted of the following: J. H. Moore, (in charge), W. H. Wright, C. D. Shane, D. H. Menzel, E. A. Fath, Ben Osen, J. F. Chappell, Clarence Mulford, Douglas Campbell, Miss Leslie Potwin, Miss Rebecca Jones, Mr. and Mrs. Kenneth Campbell, Mrs. Eugene Stephens, Conrad Swanson, William Edwards, and Edward Fletcher.

A full account of the expedition and a preliminary statement of the results obtained will appear in the December number of the *Publications of the Astronomical Society of the Pacific*.

J. H. Moore.

Mount Holyoke College Observatory

A group of alumnae and their friends from Mount Holyoke College observed the eclipse from Loveitt's Heights, South Portland, Maine. There were a few floating clouds early in the afternoon but the sky around the sun was clear during totality. Times of the four contacts were noted and the duration of totality was found by a stop-watch to be 93 seconds.

The shadow was seen approaching from the northwest by an observer stationed on the roof of the house; it was not seen by those at a lower level, but all felt the suddenness of the darkness enveloping the observer. During totality a flashlight was needed to read easily the face of a watch; one of our amateur photographers reported that she could just see the black numeral against the red indicating the number of the film in her camera.

The corona was very definitely of the minimum type with one long, almost rectangular, streamer which we could trace eastward to nearly twice the diameter of the sun, and two more pointed rays on the west, less extended. The prominences were larger and brighter than those I had seen in 1900 and 1925, and were visible to the unaided eye. The planet Jupiter, just west of the eclipsed sun, was seen by nearly all, but Mercury, more distant and less bright, eluded most of the observers. Several members of the group used their cameras more or less successfully and secured interesting photographs of the partial phases and of the corona.

Miss Porter made 5 exposures varying from 1 to 16 seconds in length on an Eastman 40 plate faced toward the corona and designed to test the general intensity of corona plus sky. The plate had previously received similar exposures to a 15-watt lamp at 4 meters and to the waning moon at the same altitude as the corona. Miss Farnsworth's plans for similar comparisons, for visual observation of the eclipsed sun, and for photography of the corona with photo-visual combination were thwarted by clouds at Douglas Hill.

Anne S. Young.

The Mount Wilson Observatory

The Mount Wilson Observatory eclipse expedition was located at Lancaster, New Hampshire, nearly on the central line of the path. The members of the party were Adams, Babcock, Dunham, Ellerman, Nicholson, and Pettit of the Observatory staff, and associated with them were Miss Calvert and Dr. Van Biesbroeck of the Yerkes Observatory, Dr. F. E. Wright of the Geophysical Laboratory of the Carnegie Institution of Washington, and Dr. Mees of the Eastman Kodak Company. Dr. Stebbins and Dr. Huffer of the University of Wisconsin and Dr. Kunz of the University of Illinois occupied a station nearby.

On the day of the eclipse the sky was generally cloudy and the sun could be seen only occasionally through small rifts. First contact was visible through clouds which became denser as totality approached and neither second nor third contact could be observed. No observations were made by any members of the party.

W. S. Adams.

PERKINS OBSERVATORY

Through the courtesy of Mr. Neal Allen, the Perkins Observatory eclipse expedition was located on private grounds near Douglas Hill, Maine.

While cloudy skies prevented direct coronal photographs, a long series of photometric observations of light changes was made with a carefully timed illuminometer by Mr. Josef Johnson, who has been research assistant at the Perkins Observatory during the last two years and who made similar observations at the Island of Niuafoou on October 22, 1930. These observations may be of some value in determining the distribution of radiation from different parts of the eclipsed sun. Cloudy skies acted as a diffusing screen for the changes in solar light during the progress of the eclipse.

The changes in the illumination were also obtained by William A. Spurr of the Western Electric Company, assisted by John Spurr. Mr. William Spurr was a member of the Harvard eclipse party to Sumatra in 1926. It was hoped that this would make possible the measure of the changing radiations in different regions of the spectrum.

Tentative reduction of measures of the illumination indicate that the total light at mid-eclipse was 0.18 foot candles which compares with 0.15 foot candles at Malaya in 1929 and 0.138 foot candles at Sumatra in 1926.

The plans for photographic observations included exposure on previously standardized plates with a 10-inch visual refractor and color screen, and with a 6-inch doublet of 36-inch focal length.

Professor M. F. Jordan, of the University of Maine, coöperated with the use of the equatorial from the Observatory at Orono, Maine, and a silvered quartz lens camera for photographing the extreme ultra-violet. The same mounting also carried a camera for exposures of the corona in the infra-red.

Members of the Ohio Wesleyan group in addition to Professor and Mrs. Stetson were Dr. and Mrs. Bobrovnikoff, Mr. Marvin Cobb, Mr. John Walker, and Mrs. M. Y. Dunton.

The staff was further augmented by Dr. and Mrs. Wallace Brode and Dr. E. S. Manson of Ohio State University. Dr. Brode operated a concave grating spectrograph for photographing the flash spectrum with moving plate, six different emulsions being used at once to cover the entire spectrum from 4,000 to 10,000 Angstroms. For the region from 7,000 to 10,000 Angstroms the new "Q" plates, transported specially for the expedition in dry ice, were utilized. Dr. Brode hoped by means of these to detect if possible the existence of calcium halides in the infra-red.

Mr. and Mrs. George Godley, of Connecticut, operated a motion picture camera to record all stages of the eclipse for purposes of a scientific record of the condition of the sky throughout the phenomenon.

Additional space in the Perkins Observatory camp was utilized by Miss Alice Farnsworth, from Mount Holyoke College, who brought special equipment for photometric observations.

HARLAN T. STETSON.
Ohio Wesleyan University, Delaware, Ohio, September 23, 1932.

Professor Edwin B. Frost's Impressions of the Eclipse

I comply with your request for a brief statement about the eclipse. It was a pleasure to be able to observe the event without the responsibility of conducting an expedition. Visits to some of the larger stations for the eclipse showed them to be well equipped and thoroughly prepared for important scientific observations, if only the weather should be favorable.

Ours was purely a family party, and we planned to move rapidly to any point which promised the most favorable weather. At noon on August 31 the U. S. Weather Station at Portland reported that a sea breeze was holding back the onset of clouds from the north and west and advised that the prospects seemed better in the Portland district than elsewhere. We accordingly drove to a hill in the town of Stroudwater, slightly west of the suburb of Westbrook and about 6 miles from sea. A few clouds passed over the sun about 20 minutes before totality but thereafter the sky was entirely clear, except in the distance and around the horizon. Mrs. Frost counted seconds, Frederick and Katherine Frost observed visually, the former with a monocular field glass of power 10 and the latter with a binocular of power 6. Photographs were made with two small hand cameras mounted on blocks set at the proper angle, by Mrs. Frederick Frost and Miss Evelyn Roth, according to a program of short and long exposures to cover the duration of totality, slightly more than 90 seconds. The prominences were readily seen in the field glasses, especially one east of the vertex and four on the west limb. The coronal streamers were strong and the one east of the vertex could easily be traced for more than two diameters of the sun. The two streamers on the west limb gave the appearance of a fish-tail, the polar rays being visible but not conspicuous in the glass. I was reminded of the appearance of the eclipse of 1900 from the descriptions given me during and after the eclipse. An enlargement of an exposure of about 15 seconds, taken by Mrs. F. H. Frost, brings out the coronal streamers quite well. The general illumination was strong during the eclipse, in the opinion of our party about equal to bright full moonlight. The watch could be very easily read. The sunset colors on the distant clouds were brilliant during totality.

I infer that children who are under seven years are not greatly impressed by such a brief phenomenon. My four year old grand-daughter commented that it was a good party but would have been better if we had had some candy along.

Williams Bay, Wisconsin, September 20, 1932.

Science Service Expedition to Summit, Mt. Washington, N. H.

When the plans of astronomical observatories were surveyed as the result of Science Service inquiries, it was found that no eclipse expedition planned to occupy the summit of Mt. Washington, New Hampshire, a peak 6,288 feet high, within eight-tenths of a mile of the center line of the path of totality of the solar eclipse of August 31, 1932.

We therefore communicated with Dr. Slocum and asked him if a small Science Service party occupying the summit would be advisable

and he encouraged the organization of such an expedition.

The "Langley Memorial Eclipse Expedition" as it was called in recognition of Langley's successful observation of the eclipse of 1878 from the summit of Pike's Peak (*Science News Letter*, Aug. 27, 1932, p. 134) was planned to be a part of the reporting of the eclipse by Science Service. Coincidently it was designed to obtain for science observations and photographs of the eclipse in the remote contingency that the summit of Mt. Washington was clear and more favorable locations at lower levels, occupied by the elaborate expeditions, were cloudy.

Apparatus was designed to be portable and extremely stable in view of the conditions upon the summit, where high winds are often experienced.

The following observations were planned: Direct photographs of the corona, motion pictures of the approaching shadow of the moon over the nearby lower peaks, motion pictures of partial and total phases of the eclipse, still photographs of shadow bands, motion pictures of shadow bands, various meteorological observations.

Prof. C. P. Olivier, director of the University of Pennsylvania's Flower Observatory at Upper Darby, Pennsylvania, and Prof. Herbert R. Morgan of the U. S. Naval Observatory (observing unofficially) coöperated with the Science Service party. Dr. Olivier operated a coronagraph of large lens diameter, using 8x10 plates. Professor Morgan provided time and planned visual observations with a small telescope.

The observing point of the Science Service party at the summit was on the rocks to the west of the Tiptop House, about a hundred yards across the rocks from the stage house.

The morning of the eclipse gave encouragement that the sun would be unobscured by clouds from the summit at time of eclipse. At about 12:30 P.M., however, clouds drifted in over the summit and only for a few minutes just before totality was the eclipse observed. The period of totality was obscured and the planned photographic and visual observations were not successful. Plates and film were exposed as scheduled in the hope that the clouds would part during totality. The meteorological observations were carried out and transmitted to Dr. Brooks.

Unhappily the clouds that enveloped Mt. Washington during the eclipse were quite general over the New Hampshire, Vermont, and Quebec eclipse area and many of the elaborate expeditions at locations of good weather probability had cloudy skies. The purpose of the Science Service party on the summit, which was to occupy the highest point in the eclipse path in spite of less favorable weather prospects than elsewhere, was accomplished.

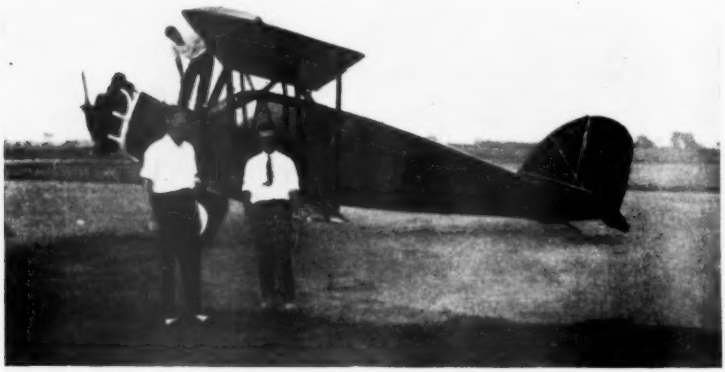
The expedition was given unfailing coöperation by many in addition to those already mentioned. Thanks are extended to Mr. Joseph Dodge of the Appalachian Mountain Club; to the Mt. Washington Club, Mr. Myron E. Witham, president, for facilities at the summit; to Mr. Henry N. Teague, president of the Mt. Washington Cog Railway; Mr. Elliot Libby of the Mt. Washington Summit Road Co.

WATSON DAVIS, *Managing Editor.*

A Specially Privileged View of the Eclipse above the Clouds

Unable to accompany the Chicago Eclipse Expedition which had left ten days earlier by automobile and truck, the opportunity to fly at a late hour offered a thrilling challenge to race the Moon's shadow travelling about twenty times as fast as the airplane to the same goal in Vermont. The 1000-mile span was covered in eight hours less ten minutes; we arrived a couple of hours ahead of the shadow, with that much time to become acquainted with the Island Pond Camp and lay-out of instruments, to practice the routine of planned participation.

Clouds had persisted all the morning. First contact occurred behind clouds; then through a thinning expanse the indented solar disk was seen. Quite discouraging prospects of visibility at total phase led to the sudden decision to leave the Camp and get above the clouds in the



The Laird Airplane, with owner, Mr. George Horton, and pilot, Mr. Alfred Sporrer.

plane waiting at the landing-field at Derby Center twenty miles away. Another eager race—this time in a Vermont taxi with maximum speed one sixtieth that of the shadow; then to accomplish the climb in time. At 3:03 E.S.T. we had ascended to 7500 feet, leaving the cruel, beautiful, fleecy blanket of clouds below at 6000 feet. Obscuration was then about eighty per cent; Venus was visible low in the western sky. Beautifully clear sky, the light deepening to a greenish purple hue as totality approached. The crescent was watched to disappearance. It did not break up into Baily's Beads, but narrowed in both dimensions until the last central point of the sun's limb faded at second contact. Then the corona of startling brilliance, no delicate colors or lessening of intensity visible toward the extremes of the streamers; the whole corona was bright. My best impression is that it was of minimum type, with short spikes toward the poles, symmetrical on both sides, with two fans. Duration was so very brief, and of course a view from the small cabin of a banking airplane, through closed windows, can not be as

comprehensive as might be had with an unobstructed view. Jupiter was easily visible at totality but no stars, nor Mercury. It was not as dark as I had expected it would be. An attempt was made to obtain photographic records with the only camera at hand, a Zeiss Baby Ikon. Development shows total failure. Had the decision to ascend not been so sudden, adequate photographic equipment would have been provided. With a small Ives diffraction grating I saw composite spectra during totality; whether the bright lines were coronal or due to prominences is indeterminate. With the same grating at the instant of second contact, Professor Henry Crew thought he caught the flash spectrum. At third contact the Diamond Ring effect was very pronounced (no other Baily's Beads); and the eclipse was over. We were conscious then of the cold, what felt like a drop of at least ten degrees in temperature, but whether this was due to the eclipse or to the altitude could not be said. The plane descended below the clouds at 3:35 E.S.T. where the rapidly growing bright solar crescent was lost except for occasional glimpses through breaks in the clouds. Last contact came while we were refuelling at Burlington, Vermont.

MAUDE BENNOT.

SPROUL OBSERVATORY OF SWARTHMORE COLLEGE

The Swarthmore College Eclipse Expedition was located on the Kingsbery Farms, five-eighths of a mile east of Derby, Vermont. The personnel going from the college consisted of Dr. John A. Miller, and Professors Ross W. Marriott, John H. Pitman, Winthrop R. Wright, and Michel Kovalenko. Associated with them were, Mr. J. H. Dugan, Mr. C. G. Thatcher, Mr. G. Bourdelais, Mr. Weld Arnold, Mr. Wilson M. Powell, Jr., Mrs. R. W. Marriott, Miss Alice M. Rogers, two seniors from Swarthmore College, Mr. George Schairer, and Mr. Max B. Miller, Jr., and Mr. George Vondermuhl, a student at Princeton University.

Professor W. B. Stearns of Milton Academy, Milton, Massachusetts, and a number of young men, most of whom were students at Milton, were associated with us but not a part of the expedition. They brought with them cameras including motion picture cameras of various types. The interest in their program was always intense and it was a delight to have them with us.

The program planned was largely a photographic one. The equipment included a lens of 63 ft. focal length, 2 lenses of 15 ft., 2 lenses of 84 inches, 2 lenses of 72 inches, and one lens of 24 inches focal length. There was also a spectrograph and an interferometer. Unfortunately dense clouds prevailed during the entire day.

The staff is indebted to the volunteer assistants who devoted their entire energies to the erection and adjustment of the instruments and would have assisted in manning them on the day of the eclipse had it been clear.

We are deeply indebted to citizens in and near Derby who spared no pains to make our stay there pleasant and profitable. Most of all we are indebted to Mr. Kingsbery Foster who permitted us to set up our instruments on his golf course and who was our host at his club hotel on the golf grounds at which we were paying guests. He smoothed the way

for us in every way possible and we came away with many kind recollections of our association with him and his colleagues.

September 23, 1932.

JOHN A. MILLER.

TRINITY COLLEGE OBSERVATORY

If you are maintaining a symposium relative to the recent eclipse of the sun, perhaps my observations made at "Indian Acres," near Fryeburg, Maine, may not be out of place.

The total solar radiation as measured by a solarimeter just before first contact was high, being, at 2:15 E.S.T., 1.45 calories per square centimeter per minute on a surface perpendicular to the direct rays of the sun. Approximately 10 per cent of this amount was doubtless due to reflection from the large number of clouds present.

During the greater part of the time between first and second contacts, the sun was covered more or less completely by clouds, with the solarimeter readings on a horizontal surface ranging from 0.056 to 0.15 calories per square centimeter per minute; at totality the reading was practically zero. (As the calibration of the solarimeter has not been checked recently, these values are given primarily for comparison but they are believed to be essentially corrct.)

Within three or four minutes of totality the clouds broke and there was an excellent view of the slender crescent; this rift lasted until a few minutes after third contact when the sun was again totally obscured.

Neither on a horizontal surface nor on one placed approximately 30 degrees with the vertical were shadow bands observed and I believe none were seen at "Indian Acres Camp."

Baily's Beads seemed not to be conspicuous at the beginning of totality but were easily recognized at the end. Jupiter was plainly visible; I noticed no stars.

During totality there was considerable precipitation; but the intensity of the shadow was disappointing to the layman and there was no "rushing-in-of-the-shadow" sensation, although the sudden return of the light was noticeable.

I timed the period of totality as 96 seconds flat, perhaps this was a second longer than the duration of the visible corona.

Taken as a whole the "Eclipse," as seen from Fryeburg, Maine, with the decreasing crescent at times but thinly veiled and with the beautiful corona uncovered, was a fascinating and satisfactory experience; one well worth traveling miles to enjoy.

CHAS. E. ROGERS.

Trinity College, Hartford, Connecticut.

UNITED STATES NAVAL OBSERVATORY

The U. S. Naval Observatory Eclipse Expedition which located near Limerick, Maine, was one of the fortunate few that obtained very good results during the solar eclipse of August 31. While not favored with ideal weather, the entire program was carried out as planned. At first contact the sun was behind a cloud for about three minutes. Thereafter it cleared and a series of five photographs was obtained for first contact

time, a similar series was obtained just before fourth contact. During totality the sky was clear, except for thin patches of cirrus clouds, and six exposures were obtained with the 65-foot camera, five with the 15-foot camera, and three each with the 38 and 33-inch cameras. In addition motion pictures were taken from first to fourth contacts. The plates with the 65-foot camera were very good and show excellent details of the inner corona and the numerous prominences.

J. F. Hellweg.
Captain, U. S. Navy, Superintendent.

University of Michigan

In making preparations for the total solar eclipse of August 31, 1932, Fryeburg, Maine, was selected as having a probability of favorable weather conditions at least as good as other locations along the shadow track.

It is impossible to speak too highly of the helpful assistance which all the expeditions located in Fryeburg received from the friendly inhabitants of this beautiful, New England village. The local Kiwanis Eclipse Committee, headed by Mr. Robert Eastman, with Asa O. Pike, 2nd, and Mr. Merrill as the other members, not only made very desirable locations available for all the expeditions, but were untiring in their readiness to assist in every way.

The writer, with his son, Baldwin ("Binks") Curtis, arrived on August 1, and the Michigan Expedition was assigned a very favorable location on a large plot at the rear of the Fryeburg Academy (where Daniel Webster once taught). The camp of the Lick Observatory was set up at the other end of this plot. A detached manual training shop was available, with power-driven, wood-working tools, and proved of very great value in the construction of apparatus. A small house had been rented, which gave good service as the headquarters of the Michigan Expedition, with Mrs. Curtis and Mrs. Margaret Curtis Walters as hostesses. This was the writer's eleventh eclipse, and he can recall no others where the arrangements provided for similar comfort, convenience, and efficiency.

The total "staff" of the Expedition on eclipse day numbered fifteen; the various instruments and their operators were as follows:

40-foot camera, for large scale coronal photographs (diameter of solar image 4.4 inches). Eight plates, with exposure times ranging from ½ second to 34 seconds, were taken. Operators, Mr. Baldwin Curtis and Mr. Kearny Garrison.

Three movie cameras were in charge of Mr. Robert R. McMath, of the McMath-Hulbert branch of the University Observatory. Mr. Francis C. McMath had the rather arduous task of the three-hour time count for all three instruments. The other observers for the movie cameras were as follows:

74-inch focus movie camera, for Baily's beads and prominences. Mr. Neil McMath.

40-inch focus movie camera. Mr. Robert R. McMath, Judge Henry S. Hulbert, and Mr. Nelson Johnson.

14-inch focus movie camera. Mr. Sidney Waldon, and Mr. Fuller, Jr. Guiding by Dr. Bernard Dawson, of the Observatory of La Plata.

The 74-inch and 40-inch movie cameras were mounted on a polar axis, with an unusually long sector segment and a high clock stand to provide for a long run without re-winding the clock. Three other instruments were also mounted on the polar axis.

A two-prism flash spectrograph, in charge of Dr. Dean B. McLaughlin.

A grating spectrograph for the infra-red flash spectrum, operated by the writer.

A large interferometer for work on the green coronal line at 5303 A. This had large etalon plates 4.8 inches in diameter, with a Ross lens of 72 inches focal length. Operated during totality by Dr. William F. Meggers, of the Bureau of Standards.

Dr. Robert M. Petrie counted seconds during totality, and gave the preliminary "calls."

Mr. Edwin S. George observed shadow bands.

GENERAL VIEW OF THE CAMP OF THE UNIVERSITY OF MICHIGAN ECLIPSE EXPEDITION AT FRYEBURG, MAINE.

The Eclipse Committee's preliminary estimate of weather chances somewhat better than 50 per cent seemed unduly roseate as the work of construction progressed; the inhabitants repeatedly consoled us with the information that it was an "unusual" summer. Clear nights and mornings were frequent, but these were almost always followed by cloudy afternoons, a bad omen for an eclipse due at 3:30 P.M.

Eclipse day itself was no exception to this general rule, and everything was uncertain after first contact; the diminished sun would stand out at times in patches of the clearest blue, to be covered again at intervals by light clouds. Totality began with a wisp of cloud over the sun, but the last sixty seconds of totality were quite good, with only some light cirrus.

Even these wisps of cirrus could not prevent us from observing that this was an unusually bright eclipse; the ring of scarlet prominences showed with exceptional brilliancy, and the longer coronal streamers extended well over a diameter. Though the expedition suffered some losses from the light clouds, the forty-foot plates are excellent, Mc-

Laughlin secured good flash spectra, and much is expected from the three movie films. All in all, we secured about 75 per cent of what we had hoped for had the sky been entirely clear, and are thankful for that, in view of the almost uniform failure which was the lot of the powerfully equipped expeditions to the north.

While the path of the total eclipse of 1925 passed over somewhat more densely populated regions, it occurred in the depth of winter. That of August 31 passed over a delightful portion of the country, and in the finest season of the year. It is doubtful whether any other eclipse has aroused more popular interest, or been observed by a larger number. The "social" features of this eclipse were quite unusual. Hundreds of visitors leaned over the ropes, which we finally had to run around the camp, eager for explanations, and Mrs. Mary McMath and the other ladies of the party rendered yeoman service in caring for such visitors. Other thousands came into the path of totality on special trains.

The eclipse of 1934, over Borneo and other islands of the East Indies, is not very fortunately located. The same may be said for that of 1937, though the astronomers of the world are looking forward to it with some eagerness. Only 98 seconds were available for our observations in Maine, while the eclipse of 1937 will be total for over seven minutes, about as long as it is possible for these beautiful but short-lived celestial phenomena. It passes over the Pacific Ocean and reaches Peru where, however, the sun will be very low in the sky. Perhaps more accurate computations, not yet carried out, may show that it will pass over some island of the Pacific. If it should, we can count on the presence of astronomers, whether they succeeded or whether clouds prevented their success in 1932, eager to utilize so "tremendous" an eclipse in solving certain problems of that nearest star which we call the sun.

This expedition was made possible through a grant from the Faculty Research Fund of the University of Michigan. Our thanks are also due to Director Robert G. Aitken of Lick Observatory, who loaned us the parts for the 40-foot camera, and to Director Frank C. Jordan, of Allegheny Observatory, for the use of the polar axis driving clock and parts and other apparatus.

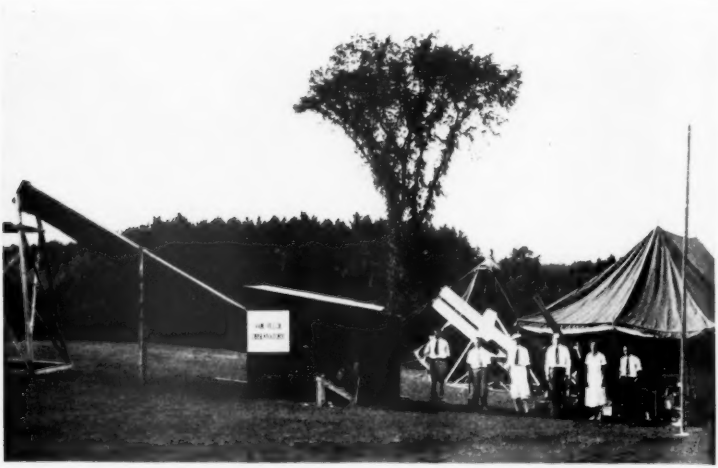
HEBER D. CURTIS.

THE VAN VLECK OBSERVATORY

At Center Conway, New Hampshire, the eclipse party of the Van Vleck Observatory of Wesleyan University carried out their complete program of observations, although the sky at no time was perfectly clear.

Nine exposures were made with a 25-foot camera, varying from one to 20 seconds in length. (Plate XI.) These show good detail in the chromosphere, prominences, and inner corona, but no great extensions. The flash spectra are fairly good, but the long exposure for the coronal lines is weak.

A plate taken with a 4-inch doublet and red filter, 6500 A, shows considerable extension. The image is small, but will stand enlargement. An Agfa color plate on a 12-foot camera, kindly loaned by the Amherst



THE VAN VLECK OBSERVATORY ECLIPSE CAMP AT CENTER CONWAY, N. H.
Left to right: B. W. Sitterly, C. L. Stearns, F. Slocum, V. Francis, Miss Lois T. Slocum, N. W. Storer.

College Observatory, shows the prominences deep red, the chromosphere orange and the corona pale green.

F. SLOCUM.

THE WARNER AND SWASEY OBSERVATORY

It seems almost superfluous to report on a total solar eclipse when clouds prevented carrying out our program during the total phase, but since some of our work brought partial success and since eclipse reports usually help in planning for future eclipses it might be well to give a short outline of the work of the expedition.

Our camp was located at Douglas Hill, Maine, at an elevation of about 820 feet above sea level and offered an uninterrupted view of the northern and western horizon. The personnel of the expedition, about twenty, was drawn principally from the faculty, graduate students, and graduates of Case School of Applied Science. The expedition from the Perkins Observatory was also located on the same hill adjacent to our camp.

The program of the first contact photographs was executed as planned. We were able to obtain seven photographs one minute apart beginning with ten minutes after the first contact. The plates, taken with a 4½-inch lens of 14 feet focal length mounted equatorially, show excellent definition. The latitude and longitude of the station being determined with sufficient accuracy, we plan to compute the time of the first contact.

A 3-inch Ross lens of 21 inches focal length was to be used to photograph the outer corona.

With a motion picture camera mounted equatorially and provided

with a lens of 24-inch focal length (F 16) we were to make exposures of 1/100 of a second and six seconds apart during the partial phase. We were able to execute part of this program. Two No. 3 density neutral filters were placed in front of the objective and supersensitive panchromatic film was used. Beginning twenty seconds before totality we were planning to take eight exposures a second and so continue during the total phase.

The temperature and barometric readings were as follows:

E.S.T. P.M.	Thermometer C	Barometer inches	Remarks
2:00	27°8	29.04	Partly cloudy
2:30	27.4	28.88	Partly cloudy
3:00	24.6	28.98	Cloudy
3:15	23.7	29.04	Very cloudy
3:28:47	22.5	29.08	Cloudy
3:29:17	22.5	29.12	Cloudy
3:30:17	22.5	29.12	Cloudy
3:45	22.7	29.12	Cloudy
4:00	22.7	29.12	Cloudy

The degree of cloudiness refers to the western part of the sky; the eastern part being mostly clear throughout the afternoon.

An Eppley Pyrheliometer (Weather Bureau type) of 10 junctions was used in a horizontal position and a Leeds and Northrup galvanometer automatically recorded the change of radiation. In spite of the intervening clouds the progress of the partial phase was shown. During totality the sensitivity of the pyrheliometer was insufficient for recording, although it was not dark enough to make artificial light necessary.

Two Weston photoelectric cells mounted in parallel were used to measure the horizontal illumination. The results were similar to those of the pyrheliometer.

During the eclipse a dictaphone was employed to record the general impressions of an observer and was found very satisfactory.

The part of our program which met with success was the radio work with Mr. Sidney McCuskey in charge. Signals were transmitted from the station on Douglas Hill beginning at 9:00 A.M., continued throughout the day at intervals of five minutes on a frequency of 7150 K.C. (41 meters), and were recorded automatically in Cleveland by means of a Leeds and Northrup Micromax Recorder. Relative intensities only were observed, although provision has been made for standardizing the measures at a later time.

Throughout the day of August 31 signal strength as measured in Cleveland remained practically constant until well after the first contact, when a gradual rise in intensity was noted. Nearly at the time of second contact a very markd and sharp rise in intensity occurred and after remaining for three minutes or so at the peak, the signal strength fell suddenly to such a low value that it was inaudible through the local background noise. At 3:45 the intensity gradually increased until shortly after fourth contact when again it soared to an unusually high value and again sharply fell off, thereafter resuming the gradual upward trend characteristic of the approaching twilight. The preliminary results seem to indicate that the portion of the ionized layer in the earth's

atmosphere by which the short radio waves are reflected is to some extent influenced by high frequency radiations from the sun.

J. J. NASSAU.

WHITIN OBSERVATORY, WELLESLEY COLLEGE

It was my intention to see the eclipse as a spectacle, and in this I was not disappointed. I was at Fryeburg, using a 60-mm Zeiss telescope mounted on a tripod and set up, by the kind permission of Professor Curtis, in the enclosure occupied by the expedition from the University of Michigan. The eyepiece used has a magnifying power of twelve and a field of view a little more than four degrees in diameter.

The total eclipse took place behind cirrus which, I estimated, cut off about half the light, but it was nevertheless a magnificent spectacle. As often happens in night observing through thin clouds, the seeing was good.

With a darkened film over the eyepiece, I watched the diminishing crescent of the sun until it broke into Baily's Beads, when the light was feeble enough to permit removing the film. The last bead, which formed a splendid "diamond" in the "diamond ring" of the inner corona, persisted until the count of five. The corona was visible a few seconds before this. The most conspicuous feature of the corona during totality was a tapering streamer in the northeast quadrant which I could trace clearly to a distance of about one and one-fourth diameters from the moon's limb. My attention was held especially by the prominences, several of which were visible at different points of the limb. Their color was not crimson, as it is sometimes represented, but rather a strong pink. In the northwest quadrant was an especially large prominence, of a height which I judged equal to a tenth of the sun's radius, which, invisible at first, was gradually uncovered as the moon passed over the sun's disk.

JOHN C. DUNCAN.

1932 September 18.

ADDITIONAL ECLIPSE NOTES

KENNEBUNK, MAINE

We selected a spot 4½ miles from Kennebunk on the old road between Kennebunk and Biddeford in the township of Kennebunkport, latitude 43° 26′ 10″ N and longitude 70° 29′ 43″ W, about 650 feet from the center line of the path of totality.

Equipment consisted of a 2⅛-inch refractor with equatorial mounting on tripod, attachment for projecting an image of the sun 2¾ inches in diameter on a cardboard screen, ship's chronometer by H. H. Heinrich, New York, No. 1014, stop watch, barometer, thermometer, paper, and pencils.

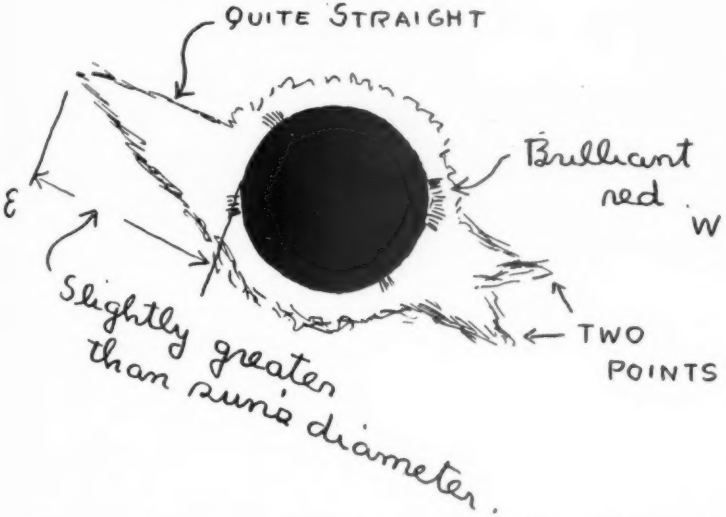
The chronometer was kindly loaned by the Bureau of Standards. The rate was found to be 0.2 second slow per day and was checked on three days preceding the eclipse by radio signals from NSS over station WIDMX through the courtesy of Mr. Kenneth Webb of Kennebunk.

The morning of August 31 was cloudy, but during the entire afternoon conditions could hardly have been better. From about 25 minutes to 15 minutes before totality light clouds drifted across the sun, but from then on the sky was

beautifully clear for a great distance from the sun in all directions. From what I have heard from persons who observed the eclipse from other points, I believe weather conditions here were better than anywhere else. I do not see how they could have been improved upon.

First and fourth contacts were observed by watching the sun's image on the cardboard screen, the angle from the north point, 307°, having been laid off to facilitate observing first contact. The second and third contacts were observed directly through the eyepiece. The times of contact, after applying the chronometer correction, were:

I	. . . . .	2h	21m	23s E.S.T.
II	. . . . .	3	30	48 "
III	. . . . .	3	32	26 "
IV	. . . . .	4	34	31 "



The record of temperature, barometric pressure, and wind conditions was as follows:

Time E.S.T.	Temp. (Fahr.)	Barom. (inches)	Wind	Time E.S.T.	Temp. (Fahr.)	Barom. (inches)	Wind
2:15	79	30.13	Light S.E.	3:25	69	30.10	Very light S.
2:20	77			3:30	69	30.10	Moderate S.
2:25	75	30.11	Light S.	3:35	68	30.10	Light S.
2:30	76	30.12	Light S.E.	3:40	67	30.10	Light S.
2:35	76	30.13	Light S.	3:45	67		
2:40	76	30.13	Light S.E.	3:50	67		
2:45	74	30.13	Light S.E.	3:55	67		
2:50	75	30.12	Moderate S.E.	4:00	68		
2:55	74		Moderate S.E.	4:05	69	30.10	
3:00	74		Moderate S.E.	4:10	69		
3:05	74	30.12	Moderate S.	4:15	70		
3:10	72			4:20	70		
3:15	71			4:25	70		
3:20	70			4:30	70		

Just before totality Baily's beads were clearly seen. Through the telescope these took on remarkable sharpness like a dotted curve drawn with a ruling pen.

None of the photographs I have seen in today's papers do justice to the appearance during totality. The corona was much more extended, particularly toward the east, and showed a wonderful structure, pointed toward the east and almost like a fish tail toward the west. Several brilliant red prominences were visible (see drawing). Toward the east the corona extended a distance greater than the sun's diameter. The sky was an intense dark blue with beautiful reds and yellows around the horizon.

At the instant when the sun reappeared the impression was that of a powerful arc light or of a very brilliant star, such as Sirius, seen in a large telescope.

As totality approached the darkness was such that a flashlight was necessary to read the chronometer. A cow in the next field started for home, "mooing" loudly. A horse in the same field paid no attention and the same was true of our dog. Here in town, I am told that night hawks appeared, and at Cape Porpoise the light keeper told me that the gulls retired to the marshes. A canary put his head under his wing as at night.

A sheet, which we had spread on the ground in the hope of seeing the shadow bands, was wet through after totality, although before the eclipse the grass was absolutely dry.

Nothing was seen of the shadow bands or of the approach of the moon's shadow.

HUGH G. BOUTELL.

September 1, 1932.

NOTES ON ECLIPSE OF AUGUST 31.

From North Limington, Maine, the Junior Astronomy Club of the American Museum of Natural History, New York City, made successful observations of the total solar eclipse. Although the sky was largely overcast throughout most of the day, partial phases were observed until about fifteen minutes before totality when a huge cloud hung almost motionless in the sky, completely hiding the sun. When hope of seeing totality had been abandoned, less than a minute remained; suddenly the cloud lifted, disclosing a marvelously beautiful narrow crescent. From this point on the group observed all the spectacular features of a total eclipse.

Throughout the entire eclipse period, separate groups were seen to be intent upon their particular tasks. Several photographers made complete series of the phases of the eclipse, coronal photos, and they attempted shadow-band pictures. One group, with telescopes and also watches corrected by radio and chronometer, timed the contacts; others observed the prominences, measured varying light intensity, recorded temperature changes, noted the action of animals, watched for stars and planets that momentarily appeared, outlined coronal features, and made rapid color notes for painting. Stationed on a distant mountain, certain members had the unusual experience of seeing miles of country to the northwest darken as the moon's shadow with prodigious rapidity swept across the landscape.

The expedition, an activity of the Junior Astronomy Club of the American Museum, numbered forty, most of whom were boys and girls of Junior and Senior High School age. Miss Dorothy A. Bennett, assistant curator in Education at the Museum, and adviser to the Junior Astronomy Club, was in charge of the expedition.

Using high-power Zeiss binoculars, we have reported the following effects: an unexpectedly "bright" eclipse, with the sky practically its ordinary blue color—

with only Jupiter and Spica visible, an unsymmetrical corona with long equatorial streamers, especially on the east, and well-defined short polar streamers; a number of particularly large rose-pink prominences of surpassing beauty; a narrow reddish ring of chromosphere, part of which appeared just before totality as an apparent extension of the remaining narrow sliver of the sun, and sundry other commonly observed phenomena, such as the shadow-bands, which were particularly elusive where observed, a brilliant "diamond ring" effect, and the Baily's Beads. Too much extraneous light, mostly from a yellow band above the horizon, defeated our attempt at seeing the shadow cast by the corona itself; the experiment needs a special light-box. The entire party had a view of the eclipse that was absolutely superb.

HUGH S. RICE.

American Museum of Natural History.

PITTSBURGH AMATEURS SEE ECLIPSE

Leaving the Valley View Observatory, Thursday, August 25, the third group of amateurs from the Pittsburgh District began their two thousand mile journey to attend the Amateur Telescope Makers convention in Springfield, Vermont, and to witness and photograph the total eclipse of the sun in New England, August 31, 1932.

Wednesday morning, the 31st, the party from Valley View carried their equipment to the top of a mountain just across a small valley from the U. S. Naval Observatory camp, and there waited for the all-too-infrequent glimpses of the sun to aid in aligning the instruments we had built for this event. Large, slow-moving clouds threatened failure until about ten minutes before totality occurred, but we were fortunate in securing an unobscured view of the spectacle. Six photographs were taken, three with each of two cameras.

Temperature readings were taken at intervals throughout the partial stages, and a drop of 12.25 degrees Fahrenheit was noted, the greatest reduction occurring about 6 minutes after mid-totality. Temperature readings taken by L. G. Scanlon at Valley View Observatory showed a drop at mid-totality (88% in Pittsburgh) of 20° F, having receded from 114° F in the aluminum dome, to 94° at maximum totality.

Temperature records made by another amateur of the group located outside the city of Pittsburgh showed a similar drop. Reception of a radio station located in Canada, as received in Pittsburgh, showed a drop in signal strength as noted by an automatic recorder. This phase of the work was carried out by Paul Ferry, radio expert of Glenfield, Pennsylvania, and his results have been forwarded to Dr. Stetson at Delaware.

After the eclipse, we visited the Harvard University and Observatory at Cambridge, and enroute home stopped off at New York City's American Museum and there greatly enjoyed the beautiful exhibit of eclipse photographs and paintings.

LEO J. SCANLON, *Secretary.*

Valley View Observatory, 106 Van Buren St., Pittsburgh, Pa.

BEHAVIOR OF ANIMALS DURING TOTAL ECLIPSE OF THE SUN.

I notice a request in the August number of POPULAR ASTRONOMY that readers, who have observed the behavior of domestic animals during the eclipse of the sun, report the same.

I did not have the opportunity to make any observations during the recent eclipse, but did so on a former occasion. No doubt the reaction of animals under

similar conditions is a good deal the same, and I will tell you about it. It was extremely droll, and made a stronger and more lasting impression upon me than did the eclipse itself.

It occurred many years ago, on our farm in Wisconsin. I was a child of twelve or fourteen. It must have been a total eclipse, because of the semi-darkness which I distinctly remember. The sky was partly cloudy, and the sun obscured, to everybody's disappointment. When the darkness descended upon us at mid-day, that peculiar darkness which is so different from either dawn or dusk, our whole flock of chickens took alarm and made a bee-line for the henhouse. From all directions they came flocking to the shelter of their roost, and the consternation was great among them. It was not the panic which will seize them when a hawk or other enemy of the barnyard looms in sight. It was a demonstration such as I had never seen among them before. Evidently they knew that something very unusual was happening. They took long strides, head and neck forward and almost touching the ground, flapping their wings to speed their progress, and all the time uttering a strange, subdued, long-drawn, weird cry, such as I had never heard proceeding from a chicken before.

The light returning, our chickens promptly came out, calm and unconcerned, apparently quite oblivious of their recent scare, looking as dumb as ever chicken at its dumbest, scratching the gravel and heading toward the garden and fields again.

It would have been interesting to watch them when they first took alarm, to see whether they associated the phenomenon with something interfering with the source of light—whether they looked toward the sun to see what was happening there. I doubt whether they have that much sense, but would give a good deal to find out for sure. I hope others of your readers succeeded better in that respect.

Salt Lake City, Utah, September 11, 1932. LIANE KRAFFT.

CHRISTINE, NORTH DAKOTA

As was requested in the last number of POPULAR ASTRONOMY, I am sending in some observations on the behavior of animals during the solar eclipse of August 31. The eclipse was at its maximum phase about 0.7 total and, although the day was clear, the sunlight was very noticeably lessened around the time of maximum phase. A herd of dairy cattle belonging to the writer's father seemed to notice something unusual to be on foot, became very restless, and gathered together in the center of the pasture and started to moo. A large flock of turkeys became excited and started to gobble and give danger signals. In both cases, the excitement died down after the phase of greatest eclipse had passed. No other domestic animals showed any observable reactions.

NOAH W. MCLEOD.

September 1, 1932.

Planet Notes for November, 1932

By CLIFFORD E. SMITH

The *Sun* will be moving southeast from the western part of Libra to the northern part of Scorpio. The distance of the earth from the sun will be about 92.1 million miles at the beginning of the month, and this distance will decrease to about 91.6 million miles by the end of the month. The position of the sun on the first and last days of the month will be, respectively: R.A. $14^h\,24^m$, Decl.

$-14° 18'$; and R.A. $16^h 23^m$, Decl. $-21° 35'$.

The phenomena of the *Moon* will occur as follows:

First Quarter	Nov.	5 at	1 A.M.	C.S.T.
Full Moon		13 "	1 A.M.	"
Last Quarter		21 "	2 A.M.	"
New Moon		27 "	7 P.M.	"
Apogee		13 "	4 A.M.	"
Perigee		27 "	9 A.M.	"

Mercury will be moving from the central part of Libra across the northern part of Scorpio to the southern part of Ophiuchus. The distance of Mercury from the earth will be about 106 million miles at the beginning of the month, and this distance will be about 40 million miles less at the end of the month. On November 14 Mercury will be at greatest elongation east (22° 36'). Conjunction with the moon will occur on November 28 (Mercury 4½° N). Mercury will be visible in the evening sky during this entire period. At the beginning of the month it will set about an hour after the sun, and at the end of the month it will set about a half hour after the sun.

Venus will be a morning star in Virgo rising about three hours before the sun. Its distance from the earth will increase from about 100 to about 120 million miles during this period. Conjunction with the moon will occur on November 25 (Venus 6° N).

Mars will be a morning star in Leo, rising about midnight. Its distance from the earth will decrease from about 145 to about 120 million miles. Conjunction with the moon will occur on November 21 (Mars 1¼° N), and quadrature east of the sun will occur on November 29.

Jupiter will be a morning star in eastern Leo, rising about 5 hours before the sun. Its apparent motion will be direct and its distance from the earth will be about 540 million miles. Conjunction with the moon will occur on November 22 (Jupiter 1¾° N).

Saturn will be an evening object in Capricornus, and during the middle of the month it will set about 5 hours after the sun. Its distance from the earth will be about 930 million miles. Conjunction with the moon will occur on November 4 (Saturn 3½° N).

Uranus will be in eastern Pisces, thus it will be above the horizon most of the night hours. During the middle of the month it will be on the meridian about 10:00 P.M. Standard Time. Its distance from the earth will be about 1800 million miles. Conjunction with the moon will occur on November 10 (Uranus 4° S).

Neptune will continue in the constellation Leo, and, during the middle of the month, it will rise about 5 hours before the sun. Its distance from the earth will be about 2800 million miles. Conjunction with the moon will occur on November 22 (Neptune ½° N).

Comet Notes

By G. VAN BIESBROECK

One new and two expected periodic comets have been discovered since the last report. We will take up these three comets in chronological order of discovery.

COMET 1932 *h* (PERIODIC BORRELLY). Periodic Comet Borrelly was found by the writer on a pair of plates exposed on the morning of July 30. The instrument used was the 24-inch reflector and the exposures were necessarily short, only four minutes each, because the object could be reached only at a low altitude shortly before daybreak. Further exposures were secured on July 31 and August 3. The total brightness was estimated as roughly equivalent to that of a 12^{M} star. The comet showed a small coma which appeared somewhat brighter on the sunward side. The following first measures were obtained:

1932	0^{h} U.T.	α h m s	δ ° ′ ″
July	30.37929	5 30 54.71	13 2 13.9
	31.38321	5 34 2.24	13 18 28.9
August	3.38493	5 43 26.14	14 6 22.8

They show that perihelion passage occurred on August 27.25, 1.25 days later than the date given in the *Handbook of the British Astronomical Association* by W. P. Henderson and Y. D. McNeile. During the months of August and September the brightness and visibility have improved; the object will be easily observable for several months. The following approximate ephemeris is from the British computation, corrected for the improved perihelion time:

1932	0^{h} U.T.	α h m s	δ ° ′
Sept.	27	8 44 50	+26 56.1
Oct.	5	9 11 37	25 51.9
	13	9 37 55	26 39.8
	21	10 3 33	27 21.5
	29	10 28 20	27 59.5
Nov.	6	10 52 3	28 35.8
	14	11 14 33	29 13.4
	22	11 35 43	29 54.8
	30	11 55 26	30 42.6
Dec.	8	12 13 31	31 38.5
	16	12 29 49	32 45.9
	24	12 44 11	33 59.4
	32	12 56 49	+35 2.0

COMET 1932 *k* (PELTIER-WHIPPLE). This is by far the brightest comet that has been visible for some time, since it very nearly reached naked-eye visibility in August. It was first discovered by L. C. Peltier of Delphos, Ohio, this being the third new comet that comes to the credit of this indefatigable observer. Besides gathering more observations of variable stars than any other observer in this country, as can be seen from the monthly reports of the A.A.V.S.O., this industrious amateur finds the time to sweep the sky regularly for comets. He has no instruments for securing positions and has made the arrangement with the writer that when he finds a comet he will wire at once to the Yerkes Observatory for an accurate determination of the position. Last month he telegraphed that he had found a comet of magnitude 13 in Libra: it proved to be Kopff's periodic comet that was under observation since last May.

On August 9 the mail brought a letter from Mr. Peltier in which he wrote under date August 8: "Thank you for your reply to my recent wire concerning Kopff's comet. I picked up another last night in R.A. $3^{h}\,05^{m}$, D $+31^{\circ}\,30'$, north motion. Its magnitude was about 8. Being so conspicuous I'm sure it is well known by this time hence this letter instead of a wire." I knew at once that this was a new object and without waiting for the night I relayed the information to the Harvard Observatory (August 9 noon C.S.T. by wire). In the morning of

this same day Dr. F. L. Whipple at the Harvard College Observatory had developed a sky patrol plate exposed three days earlier and noticed an image that looked like that of a comet of about 7M. The original plate was on exhibit at the time of the meeting of I.A.U. It showed the comet very plainly. Wishing to confirm the discovery visually, Mr. Whipple decided to postpone the announcement until the night, but the telegram from Peltier came in the meantime so that the independent Harvard discovery was confirmed at once. The comet will therefore bear the name Peltier-Whipple. Mr. Peltier supplemented his first information as follows (August 12): "I found the object in the course of a regular comet search about midnight on the night of August 7 (August 8.25 U.T.). I have seen it every night since then and have detected little, if any, change in brightness. It has an almost stellar nucleus. I estimated this as 8M on August 12. In my 6-inch the tail appears to be about a degree long." Expressing some disappointment at not having found "a brand new comet all of his own" he adds: "In the future I think I will wire you everything I find, even if the object is brighter than Venus."

FIG. 1. COMET PELTIER-WHIPPLE, 1932 AUGUST 12.

On the night of August 9 the comet was also independently found by H. T. Sase in Southern California, according to information received from Dr. W. S. Adams, Director of the Mt. Wilson Observatory. The first observations, viz.,

	α			δ				
0^h U.T.	h	m	s	°	′	″	M	
Aug. 6.3219	2	59	22.5	27	3	48	7	Whipple
8.3219	3	5	....	31	30	..	8	Peltier
10.21468	3	9	19.50	36	31	48.2	7.5	Whipple & Cunningham
10.33477	3	9	40.54	36	50	41.3	7	Van Biesbroeck

showed the rapid northerly motion of the comet which passed quickly through the constellation of Perseus. On August 10 I estimated the total brightness as 7M.0 (P.D. scale) by extra-focal comparisons using a binocular. The coma had then a diameter of about 5′ and there was a sharp nucleus corresponding in brightness to an 8M star. Out of this nucleus emanated a small fan of 80° opening in a direction opposite to that of the main tail, which was visible (4-inch finder) over

nearly 1° in position angle 243°. This was confirmed by a 20 minute exposure with the 24-inch reflector which showed besides a much fainter but broader tail in position angle 140° and about 15′ in extent. Fig. 1 is enlarged from a plate taken August 12. The original shows the tail over a length of 1°.2.

With the aid of the early position on August 6, computations were soon started on the orbit. The following parabolic elements are at hand:

	Computers			
	Whipple and Cunningham (Harvard)	Anderson and Cherrington (Berkeley)	J. Möller (Copenhagen)	F. Koebcke (Poznan)
T	Sept. 1.51	Sept. 1.75516	Sept. 1.178	Sept. 1.7258
ω	38° 10′	38° 29′ 41″	37° 44′ 12″	38° 27′ 21″
☊	344 40	344 46 20	344 29 48	344 46 15
i	71 49	72 4 2	71 26 32	72 3 16
q	1.039	1.038304	1.04018	1.03851
Dates	6-10.2-10.9	6-10-14	11-13-15	11-11-15

A. Maxwell (Ann Arbor) computed an ellipse corresponding to a period of 24 years but the arc is too short to indicate a definite deviation from a parabola. The position of the highly inclined orbit is represented herewith (Fig. 2). The yearly path of the earth around the sun is represented in perspective by an ellipse.

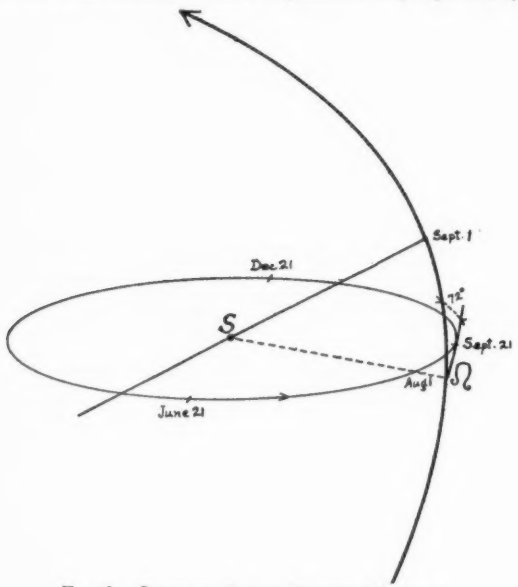


Fig. 2. Orbit of Comet Peltier-Whipple.

The line S ☊ represents the intersection of the plane of the orbit of the comet with that of the earth. The angle between the two is 72 degrees. In its northward course the comet passed this line of nodes on August 1. One month later, September 1, the comet was nearest to the sun. The line joining this position to the sun represents the axis of symmetry of the orbit. At the time of discovery the comet

was nearly at its brightest and at minimum distance from the earth. During August several observers estimated the total brightness as 6^M which is just within visibility for the naked eye. On September 1 the comet, being then in the constellation of Draco, passed within 10° of the north pole. During September it remained circumpolar but gradually lost in brightness while following its course through Ursa Major. I have computed the following ephemeris from the Berkeley elements given above; this ought to be close enough for following the fading comet for some time.

EPHEMERIS OF COMET 1932 *k*.

1932 0^h U.T.		α h m	δ ° ′	M
Sept.	26	13 40.9	+58 52	9.0
	30	47.6	56 32	9.4
Oct.	4	53.2	54 32	9.7
	8	57.7	52 41	10.0
	12	14 1.8	51 7	10.3
	16	5.4	49 43	10.5
	20	8.7	48 31	10.8
	24	11.7	47 27	11.0
	28	14.5	46 33	11.2
Nov.	1	17.1	+45 47	11.4

On September 26 the correction was -0^m3 and +8′. The magnitude is assumed to be 9 on September 26. I estimated the magnitude as 8.5 on September 19.

COMET 1932 *l* (PERIODIC FAYE). The return of this comet was first recorded by A. Schwassmann at the Bergedorf Observatory (Germany). A plate exposed for 2½ hours showed the comet as a coma of 12^M near the position predicted by Crommelin (*Handbook of the British Astronomical Association*, p. 42). The first observation gave:

1932 Aug. 30.0258 $0^h 27^m 1^s8$ +14° 53′ 32″

From this it appears that perihelion falls on 1932 December 5.38, only half a day sooner than had been calculated. The following ephemeris (*C.I.A.U.* 402) shows that the comet will travel slowly across the constellation of Pisces and reach its maximum brightness by the end of October. It is well placed for observation but is not expected to become brighter than the 10th magnitude.

1932 0^h U.T.		α h m s	δ ° ′
Sept.	25	0 29 4	+12 18
Oct.	3	27 50	10 38
	11	26 55	8 40
	19	26 40	6 36
	27	27 34	4 34
Nov.	4	30 32	2 46
	12	0 35 25	+ 1 17

This is the ninth return of this periodic object since it was first found in 1843. Its period is 7.3 years and it was last observed in 1925.

Three of the previously reported comets continue to be under observation but they are not accessible to small instruments:

COMET 1932 *e* (PERIODIC KOPFF) remains faintly visible in the southwestern sky after sunset. The continuation of the ephemeris by Kepinsky is as follows:

1932 0^h U.T.		α h m s	δ ° ′
Sept.	29	17 56 16	−17 0
Oct.	3	18 6 29	16 52
	7	16 45	16 42
	11	27 3	16 30
	15	37 22	16 16
	19	47 41	16 0
	23	18 58 0	15 43
	27	19 8 16	15 24
	31	18 31	15 2
Nov.	4	28 42	−14 39

COMET 1932*f* (NEWMAN) can be found after sunset in the northwestern part of the sky. Whipple and Cunningham (Harvard) have corrected their first elements on the basis of observations between June 1 and July 3 with the result:

$$\left.\begin{aligned} T &= 1932\ \text{Sept. } 24.41\ \text{U.T.} \\ \omega &= 69^\circ\ 39'.2 \\ \Omega &= 245\ \ 9.5 \\ i &= 78\ \ 27.2 \end{aligned}\right\} 1932$$
$$q = 1.6495\ \text{astr. units}$$

EPHEMERIS (C.I.A.U. 396) FOR 1932*f*

1932 0^h U.T.		α h m s	δ ° ′
Sept.	30	15 35 14	+36 53.4
Oct.	4	42 0	37 37.9
	8	49 19	38 24.1
	12	15 57 13	39 12.2
	16	16 5 45	40 2.3
	20	14 58	40 54.3
	24	24 55	41 48.2
	28	16 35 40	+42 44.0

There will be little change in brightness for some time. On September 20 I estimated the total magnitude as 12.5.

COMET 1932*g* (GEDDES) has been well observed in the southern hemisphere. It comes to superior conjunction with the sun in November and will not be in reach of northern stations until the beginning of next year.

Although it is now favorably situated, PERIODIC COMET BROOKS has not yet been recovered. It seems to be fainter than is expected but may be found before long.

The search should also be continued for COMET 1866 I (TEMPEL) of the November meteors. There is considerable uncertainty in the prediction but of the different search ephemerides Crommelin considers the following as the most promising:

1932 0^h U.T.		α h m s	δ ° ′
Sept.	25	9 56 40	+22 52
Oct.	3	9 56 10	22 39
	11	9 56 8	22 24
	19	9 55 36	22 5
	27	9 54 28	+21 29

Williams Bay, Wisconsin, September 20, 1932.

POSTSCRIPT TO THE COMET NOTES (September 25).

PERIODIC COMET BROOKS was found here last night by the writer. Photographs with the 24-inch reflector on the previous nights had not shown the comet in the computed position. Hence I swept the vicinity visually with the same instrument and noticed a suspicious object about 2½ degrees from the expected place. This was at 17^h U.T. On further examination it proved to be the slowly moving comet. Afterwards I measured it with the 40-inch refractor:

1932 Sept. 25.34351 U.T. 0^h 46^m 13^s.84 +2° 55′ 9″.6

This observation gives for the date of perihelion: October 9.51 from the right ascension, October 9.65 from the declination. This is two days later than was expected. The search ephemeris by F. R. Cripps (*Handbook Brit. Astr. Assoc.*, p. 39) interpolated for T October 9.6 becomes

1932 0^h U.T.		α h m	δ ° ′
Sept.	26	0 45.7	+2 48
Oct.	4	43.2	1 42
	12	40.9	+0 39
	20	38.9	−0 15
	28	38.0	0 55
Nov.	5	38.1	−1 18

G.V.B.

Meteor Notes from the American Meteor Society

By CHARLES P. OLIVIER, President

Since the last Meteor Notes appeared, two events have occurred which are of importance in meteoric astronomy. The first was the good Perseid shower of August, more widely observed than any shower in recorded history, if we may judge from the reports so far received. The second was the meeting of the Commission des Etoiles Filantes of the International Astronomical Union, held at Harvard early in September.

In this paper will be given the resumé of counts during the period August 6 to 15, inclusive, of meteors recorded by non-members who reported observations of at least one hour's length, with the date, times, and numbers definitely stated. The reports of our members will be published later, along with reports not yet in from non-members. In all, to date, 327 non-members and 38 members have reported. Most of the former made counts, in accordance with instructions; most of the latter mapped a large percentage of the meteors they saw. For the Perseid dates included in these tables, about 32,700 meteors have been reported to the A.M.S. from all sources. Undoubtedly more reports are yet to arrive. Such an interest in the subject breaks all records, and promises well for the future, particularly as to the proper observation of the Leonid showers this November and in November, 1933.

At the Harvard meeting of the International Astronomical Union, the Commission des Etoiles Filantes had two meetings, each with a good proportion of its own members present and thirty or forty visitors or other members of the Union. The first meeting was devoted to the report of progress and recommendations, the second, to a report of the Harvard Meteor Expedition to Arizona and a brief discussion of Meteor Crater, Arizona. Also it was decided to ask the Union to petition the French Government to send an expedition to recover the

great meteoric mass in the Adrar, North Africa, and the Government of the U.S.S.R. to send one to study completely the region in Siberia of the fall of 1908 June 30. At the general assembly of the Union on September 8, both of these recommendations were adopted. It is hoped that these official requests from the I.A.U. will induce both governments promptly to undertake such expeditions, which, if successful, will have the greatest effect in enlarging our knowledge of meteoric astronomy.

A plan is being perfected for regular observations of meteors by members of the Byrd Antarctic Expedition, which is due to sail in 1933. Such observations, carried out for 24 consecutive hours, will be entirely unique, and should lead to valuable results.

Every member of the A.M.S. should make proper preparations for the Leonids this November. We have good reason to expect a great shower, and the period from the night of November 13-14 to that of November 18-19 should be covered sufficiently to be sure that the main shower is not missed. Probably the nights of November 15-16 and 16-17 are the most favorable for good displays. Duplicate observations of long-enduring trains, particularly at one minute intervals, which can be used for parallax and drift computations, are the most valuable data to be secured. Observers 20 to 100 miles apart should by all means get in touch with one another and plan simultaneous watches. We will be glad to give advice in specific cases if written to on the subject. Photographs of very brilliant trains, even with ordinary kodaks, may also be obtainable, and will be very valuable if the camera is rigidly fixed on a tripod, and exposures taken at intervals of one or two minutes, each photograph being carefully timed as to mid-exposure.

Name and Station	1932 Aug.	Began	Ended	Total	Met.	Fac.	Rem.
Bell, P. R. Jr., Birmingham, Ala.	10	11:30	15:30	240	172	1.0	1
May, James, Birmingham, Ala.	10	11:30	15:30	240	202	1.0	1
	11	12:45	15:00	135	269	1.0	1, 3
Flowers, J. Morgan Jr., Birmingham	10	13:30	15:30	120	92	1.0	1
Stovall, Emory, Birmingham, Ala.	10	12:00	14:00	120	102	1.0	1
Sutton, A., Prescott, Arizona	11	10:00	11:00	60	17	1.0	2
Clary, B. L., Coachella, Calif.	10	13:15	14:15	60	37	1.0	1
	11	14:15	15:15	60	67	1.0	1
Luz, G. R., Hanford, Calif.	9	10:30	13:00	120	35	0.9	2
	10	12:00	15:30	150	129	0.9	2
	11	12:00	15:30	150	157	0.9	2
Lee, C. F., Livermore, Calif.	11	13:40	15:10	90	96	0.9	2
Goodin, R. E., Monterey Park, Calif.	10	12:15	13:20	65	8	0.9	4
Bakker, H., Oakland, Calif.	11	13:25	16:01	156	72	..	1, 5
Bennett, Andrew B., San Jose, Calif.	9	12:00	13:00	60	20	0.9	2, 6
	11	12:00	14:00	120	66	1.0	1, 6
	12	12:00	14:01	121	25	1.0	1, 6
	13	12:00	14:00	120	9	1.0	1, 6
Stone, W. R., Santa Barbara, Calif.	9	12:45	15:45	180	23	1.0	2, 4 E
	10	12:00	16:00	240	63	1.0	2, 4 E
	11	11:30	15:30	240	56	1.0	2, 4 E
Crawford, Mrs. M. L., S. Pasadena, Calif.	10	9:00	14:30	330	255	..	Group
Rinkel, R., Bridgeport, Conn.	11	10:55	11:55	60	23	1.0	2 NE
	12	11:00	12:00	60	9	0.8	2 NE
Thomas, Helen L., Columbia Lake, Conn.	11	12:00	14:00	120	86	1.0	2 NE
Squires, G. T. F., E. Hartford, Conn.	11	10:45	12:15	90	46	1.0	1, 4
	12	10:45	12:00	75	15	1.0	1, 4
Burghardt, G., and Looney, Francis, New Haven, Conn.	11	11:00	13:00	120	100	1.0	1, 7

Name and Station	1932 Aug.	Began	Ended	Total	Met.	Fac.	Rem.
Waln, Rev. Y. O., Niantic, Conn.	11	14:00	15:00	60	100	..	2
	12	14:00	15:00	60	63	..	2
	13	14:00	15:00	60	28	..	2
Johnson, R. M., Northfield, Conn.	11	10:45	15:00	255	493	..	1
Taty, Q., Torrington, Conn.	10	12:09	14:30	141	30	..	1
Northend, Mrs. E., W. Hartford, Conn.	11	12:00	15:00	180	148	1.0	
Chapman, A. L., Winsted, Conn.	11	12:05	13:50	105	102	1.0	3
Preston, H. K., Newark, Delaware	11	11:15	13:25	130	50	..	
Lorand, Eva M., Wilmington, Del.	11	12:20	13:20	60	29	0.8	2 SW
Mack, J. Jr., Atlantic Beach, Fla.	11	12:30	14:00	90	81	..	1
Moody, Miss J. E., Milton, Fla.	11	13:00	14:30	90	56	..	2
Walker, R. P., Athens, Ga.	11	13:35	14:35	60	35	1.0	2
Edwards, J. L., Atlanta, Ga.	11	14:30	15:30	60	28	..	1
Fisher, R. E., Atlanta, Ga.	10	9:45	11:45	120	25	..	1
	11	9:10	12:51	221	44	..	1, 4
Higgs, Mrs. J. A., Atlanta, Ga.	11	11:30	13:00	90	42	..	1
Smith, F. P., Atlanta, Ga.	11	12:10	13:10	60	39	..	2
Payne, L. G., Carnesville, Ga.	11	10:00	17:00	420	448	..	1
Whatley, R., Carrollton, Ga.	11	12:00	13:00	60	19	..	1 NNE
Brice, R. T., Decatur, Ga.	9	11:24	15:54	270	85	..	1, 3, 8
	10	11:52	15:52	240	205	0.9	1, 3, 8
	11	12:00	16:00	240	451	..	1, 3, 8
McCrary, Dr. J. O., Royston, Ga.	11	13:30	16:00	150	167	0.9	1
Denns, C. H., Royston, Ga.	10	12:30	15:00	150	580	..	
Guseman, L., Peterson, A., and Backes, R., Aurora, Ill.	12 13	11:30	15:30	210	279	..	1, 3
		11:30	15:30	180	72	..	1, 3
Heil, R., Marissa, Ill.	10	10:45	12:45	120	59	..	1, 4
Flanagan, P. W. F., and Lawton, H., New Orleans, La.	11	12:00	16:30	270	162	1.0	1, 3?
Macdougall, J. E., Slidell, La.	9	12:00	13:00	60	24	..	2
	10	12:00	13:00	60	24	..	2
Fisher, L. W., Lewiston, Me.	10	11:17	12:17	60	30	..	1
Phair, Mrs. R. A., Moody, Me.	11	11:00	13:05	125	104	..	
Gridley, T. J., Saco, Me.	11	11:00	12:00	60	38	..	2
Elliott, R. M., W. Southport, Me.	11	13:30	14:30	60	62	..	2
Mann, C. A., Cheltenham, Md.	11	10:00	11:30	90	21	0.5	1, 3
Onderdonk, P. B., Riderwood, Md.	11	12:15	13:26	71	74	..	1
Moore, Donald, and Tilford, Robt., Sparrows Point, Md.	9 11	9:15	10:30	75	4	..	9
		8:00	16:40	520	179	..	1, 9
Wenzel, O., Amesbury, Mass.	10	11:45	12:45	60	8	..	2, NW
Thorp, W. L., Amherst, Mass.	11	13:40	15:16	90	123	1.0	2
	12	14:20	15:20	60	29	0.8	2
Thorp, Mrs. H. C., Amherst, Mass.	11	13:40	15:16	90	148	1.0	2
(Reported by W. L. Thorp)	12	14:20	15:20	60	57	1.0	2
Bowditch, R. S., Amherst, Mass.	11	13:40	15:05	60	93	1.0	2
(Reported by W. L. Thorp)	12	14:20	15:20	60	44	0.8	2
Robinson, P. F., Boston, Mass.	11	11:00	13:00	120	24	..	
Burroughs Newsboys Foundatn., Boston.	11	8:00	11:58	238	25	..	1, group
Skinner, G. B., Brockton, Mass.	11	9:15	12:15	180	31	..	Moon
Gushee, V. M., Ludlow, Mass.	11	12:50	13:50	60	39	..	South
Gushee, R. H., Ludlow, Mass.	11	12:50	13:50	60	30	..	North
Young, E. A., Medfield, Mass.	11	12:45	14:00	75	42	..	
Dubois, E. A., W. Somerville, Mass.	12	13:20	15:45	145	28	1.0	6
Heintz, A. P., W. Somerville, Mass.	11	11:30	13:00	90	61	..	2
Munson, E. B., Williamsburg, Mass.	11	12:00	13:00	60	52	..	2
Davis, W. W., Worcester, Mass.	11	13:00	14:00	60	44	..	2
Wilson, A. W., Ann Arbor, Mich.	11	11:15	14:07	172	169	0.9	1
Wilson, R. J., Byron Center, Mich.	10	12:00	16:00	210	173	..	1
	11	13:00	15:00	120	172	..	1
	12	14:00	16:00	120	111	..	1

Name and Station	1932 Aug.	Began	Ended	Total	Met.	Fac.	Rem.
Tucker, I. C., Davison, Mich.	10	13:00	16:10	150	101	0.6	Fog, 1
	11	13:10	16:15	180	217	1.0	1
	12	14:40	16:25	105	154	1.0	1
Hook, A., Grand Rapids, Mich.	11	8:50	12:50	240	82	0.7	1
Kemp, H. H., Grand Rapids, Mich.	11	12:00	16:30	270	180	0.9	1
Newton, K. E., Grand Rapids, Mich.	12	12:15	13:30	75	133	0.9	
Pierce-Schafer, A., Grand Rapids	12	11:50	12:50	60	22	1.0	2
Sherred, L. E., Fisk Knob, Mich.	11	12:00	14:45	165	114	0.9	1
Walker, Miss E. J., Nunica, Mich.	11	12:00	14:00	120	107	0.7	3
Gardner, Miss V., Menominee, Mich.	11	13:35	15:46	121	44	..	10
	12	13:25	15:30	112	40	..	10
Maynard, Miss B., Otsego Lake, Mich.	11	10:25	12:20	110	45	..	2
Buss, H., Reed City, Mich.	11	12:00	13:00	60	64	..	2
Jensen, Miss T., and Clark, Miss P., Kansas City, Mo.	11	13:30	16:30	180	159	..	3
Manning, Dr. H., Kansas City, Mo.	10	12:30	16:20	230	147	..	2
Waters, Mrs. M., Kansas City, Mo.	10	12:30	16:00	210	63	..	2, NE
Freeman, R. W., Owensville, Mo.	8	12:30	15:10	100	31	..	1
	10	12:00	16:00	210	138	..	1
Bosserman, W. P., West Plains, Mo.	11	13:35	15:05	90	116	..	1
True, Miss R., and Woodcock, Miss L. P., Lake Winnipesaukee, N. H.	11	12:00	13:00	60	49	..	2
	11	12:00	13:00	60	51	..	2
Jones, E. H., Goffstown, N. H.	11	11:30	13:15	105	24	..	
Rosenblum, Miss M., Belleville, N. J.	11	12:00	13:10	70	34	1.0	
	12	12:00	13:00	60	11	0.9	2
Cummins, Mrs. A. E., Clifton, N. J.	11	11:45	14:00	135	17	..	
Lipton, B., Elizabeth, N. J.	9	10:15	13:00	165	86	..	1
	11	11:00	15:45	285	196	0.8	1
Potter, N., Glen Ridge, N. J.	11	12:00	14:00	120	68	0.9	ENE
O'Donnell, W. J., Jersey City, N. J.	11	12:00	13:55	115	23	1.0	
Williams, R., Lambertville, N. J.	11	12:00	14:30	150	35	..	
Carruth, F. E. Jr., Maywood, N. J.	11	11:00	14:10	190	93	..	1
Crouse, H. R., Milford, N. J.	11	14:23	15:30	67	123	..	1, 3
Mendenhall, H. E., Orange, N. J.	11	11:00	15:15	255	88	..	2
Leeds, C. W. Jr., Pleasantville, N. J.	11	11:45	14:00	135	81	1.0	1
Warsamer, Miss B., Pt. Pleasant, N. J.	11	12:30	15:30	180	79	0.6	2
Schroeder, A. H., Ridgewood, N. J.	11	11:37	13:40	123	55	1.0	NE
Cole, Mrs. R. M., Seaside Park, N. J.	12	12:00	13:45	105	43	..	
Truxton, J. D. Jr., Trenton, N. J.	12	15:00	16:00	60	80	..	3
	13	14:45	15:45	60	125	..	3
Baird, E. E., Magdalena, N. Mexico	11	12:00	13:00	60	27	..	1
Graham, Dr. C. F., Albany, N. Y.	11	11:00	12:30	90	52	..	1
Molyneaux, D., Binghamton, N. Y.	11	13:00	15:30	150	107	0.8	1
	12	13:00	14:30	90	45	1.0	1
Rosenberg, B., Bronx, N. Y.	11	12:00	14:00	120	45	1.0	1
Borodulin, A., Brooklyn, N. Y.	11	12:30	13:30	60	21	0.8	
	12	12:30	13:30	60	17	..	
Conwell, W. A., Brooklyn, N. Y.	12	8:15	9:15	60	5	0.9	
Gatner, E. S. M., Brooklyn, N. Y.	11	10:45	11:45	60	116	1.0	
Kaempf, F. W., Brooklyn, N. Y.	11	10:45	12:35	110	25	1.0	1
	12	10:45	11:55	70	13	1.0	1
Schumpf, B. J., Brooklyn, N. Y.	10	12:30	16:45	255	107	..	1
	11	12:45	16:30	225	75	..	1
	12	12:45	17:00	255	50	..	1
Ballou, J. W., Buffalo, N. Y.	11	10:00	13:00	120	44	0.8	1
Doti, R., Elmsford, N. Y.	11	12:00	13:30	90	112	..	1
	12	12:00	13:00	90	101	..	1
Lindros, C., Farmingdale, L. I., N. Y.	11	13:20	14:20	60	35	1.0	

Name and Station	1932 Aug.	Began	Ended	Total	Met.	Fac.	Rem.
Iedema, N., Great Neck, L. I., N. Y.	11	15:00	16:00	60	20	1.0	
	12	14:40	16:00	80	10	1.0	6
	13	14:45	16:00	75	10	1.0	6
Rhodes, F. K., Great Neck, L. I.	11	11:40	13:40	120	53	..	1
Robinson, Miss E., Hague-on-Lake-George, N. Y.	11	12:15	14:15	120	210	..	
	12	12:30	13:30	60	8	0.5?	
McCulloch, A. H., Kenmore, N. Y.	10	13:00	16:00	180	41	1.0	1, 12
	11	10:30	16:00	330	71	1.0	1, 12
	12	12:00	16:00	240	30	1.0	1, 12
Rich, A. D., Lockport, N. Y.	11	10:45	12:45	120	36	1.0	1, 12
Loundis, Miss S., Lynbrook, L. I., N.Y.	11	11:50	14:45	175	120	1.0	Some plotted
Moore, Dr. A. S., Middletown, N. Y.	11	12:15	13:15	60	46	..	NE
Ericson, Miss A., New Rochelle, N. Y.	11	11:45	12:45	60	18		
Bernhard, H., Bayside, L. I., N. Y.	12	12:30	14:30	120	24	..	Some plotted
Friedenthal, L., Rye Beach, N. Y.	11	12:45	15:00	90	68	1.0	1
Friedenthal, Mrs. L., Rye Beach, N. Y.	11	12:55	15:00	90	67	1.0	1
MacLean, Dr. W. M., New York, N. Y.	9	11:06	12:59	113	14	..	
	11	11:30	13:48	138	24	..	
Dusenberry, Miss N. J., Oak Beach, N.Y	11	9:10	11:10	120	36	0.9	2, NE
Hohman, J. P., Stapleton, L. I., N. Y.	12	13:27	15:35	128	36	..	1
O'Connor, W. F., and Cleary, Miss M., Yonkers, N. Y.	11	11:55	14:10	135	65	1.0	1, 3
Lawrence, Mrs. G., Chapel Hill, N. C.	11	12:55	13:55	60	51	..	
Lawrence, G., Chapel Hill, N. C.	11	12:55	13:55	60	31	..	
Mirchison, Miss N., Chapel Hill, N. C.	11	12:55	13:55	60	39	..	
Graheel, C. E., Oteen, N. C.	11	11:00	13:00	120	41	..	2
Meyer, F. G. W., Dayton, Ohio	7	12:30	13:30	60	17	1.0	
	8	12:30	13:30	60	15	0.7	
	9	11:00	12:30	90	15	0.5	
	11	12:15	13:15	60	37	1.0	
Brumbaugh, R., Lakwood, Ohio	11	12:00	13:30	90	92	..	1
Albaugh, R. B., Mayfield Heights, O.	11	11:15	12:30	65	21	..	
Shafer, A. M., Navarre, Ohio	10	12:00	13:00	60	18	..	
Lennon, C. E., Mangum, Okla.	11	14:00	15:30	60	76	..	
Woods, H. I., Stillwater, Okla.	11	13:15	15:15	120	98	1.0	2, 11
(See note for station)	12	13:40	15:10	90	60	1.0	2, 11
Dickey, D., Tulsa, Okla.	10	11:00	12:50	90	38	..	1
	11	13:30	16:15	75	64	..	1, 12
Fraser, J. I., Tulsa, Okla.	11	13:30	14:30	60	57	..	
Percival, J., Tulsa, Okla.	10	11:00	14:15	120	65	..	1
	11	13:30	16:30	120	140	..	1, 12
Hibshman, H. J., Ambler, Pa.	11	13:20	16:20	180	119	0.9	1, E
Williams, H. A., Bellefonte, Pa.	11	12:00	13:20	80	81	..	
Williams, W. E., Berwick, Pa.	9	12:00	13:00	60	21	0.9	6
	11	12:00	13:00	60	50	1.0	6
Clark, Mrs. H. W., and Clark, Miss D., Chambersburg, Pa	11	12:00	13:18	78	101	..	1, 3
	11	13:20	14:20	60	64	..	10
Strom, C. A. W., and group, Cresco, Pa.	11	12:00	14:00	120	243	1.0	2
Council, J. E., Hershey, Pa.	11	10:10	12:45	130	49	..	1
Smart, R. E., Kane, Pa.	12	12:30	14:00	90	132	1.0	2
Woerner, H. R., and three others, Lancaster, Pa.	11	12:00	13:00	60	42	1.0	1, 3
Woerner, H. R., and two others, Lancaster, Pa.	12	14:10	15:25	75	115	1.0	1, 3
Bolla, Mrs. E. T., Lehighton, Pa.	11	12:00	13:00	60	93	..	1, 3
Slonaker, R. E., and Neuner, E., Nazareth, Pa.	11	12:30	14:30	120	94	0.6	1, 3
Droll, G. R., Philadelphia, Pa.	11	14:20	15:40	80	98	1.0	

Name and Station	1932 Aug.	Began	Ended	Total	Met.	Fac.	Rem.
Friedman, Miss N., Philadelphia, Pa.	11	11:50	13:25	95	7	0.4	
Grubb, H. E., Pomeroy, Pa.	11	12:00	15:00	180	141	0.9	1
	12	13:00	16:30	210	186	1.0	1
Duke, Miss J. G., Shippensburg, Pa.	10	11:10	14:00	170	9	..	4, 10
	12	11:32	13:33	121	7	..	4, 10
Bodtke, R. E., Ocean Gate, N. J.	11	13:30	14:30	60	40	0.6	
Groothius, Miss M., and Donahue, Miss R., Upper Darby, Pa.	11	12:30	16:14	224	70	?	1, 3, 4
MacAdam, D. L., Swarthmore, Pa.	11	12:00	16:00	240	215	..	
Mumma, Miss B. F., Waynesboro, Pa.	11	12:20	14:00	100	125	..	
DuBois, G. W., Willow Grove, Pa.	11	14:25	15:58	93	12	..	
Knock, R., and Tauser, D. L.,	11	12:00	14:00	120	216	0.9	1, 3
York, Pa.	12	13:30	14:30	60	66	0.9	1, 3
Ruby, G. C., York, Pa.	11	12:30	16:00	210	186	1.0	1, N
Ruby, Miss M., York, Pa.	13	13:45	15:00	75	14	..	1
Ruby, Miss M. C., York, Pa.	11	11:30	15:00	210	216	1.0	1, NW
Clark, J. H., St. George, S. C.	11	14:40	16:25	60	53	..	1
Edwards, Mrs. O., and 3 others, Georgetown, Texas	11	12:00	15:30	210	76	..	2, 3
Daingerfield, L. H., Houston, Texas	11	13:00	14:00	60	25	1.0	1
Edmundson, M. I., Houston, Texas	11	15:00	16:15	75	24	..	1
Moore, A., Houston, Texas	11	13:00	15:00	120	198	1.0	1, N
Gillett, Dr. R. B., Pleasanton, Texas	9	10:00	13:30	210	37	1.0	1
	10	10:30	13:00	150	23	..	
Scott, C. E., Roanoke, Va.	9	11:00	13:00	120	59	..	1
	10	11:00	13:00	120	76	..	1
Stoddard, E. L., Staunton, Va.	12	14:05	15:05	60	58	0.9	NE, E
Farr, Miss S., Brandon, Vermont	9	11:05	13:35	150	33	0.7	2, SE, E
	11	11:50	14:20	120	88	0.9	2, W, SW
Olmsted, Miss E., Brandon, Vt.	11	14:20	15:20	60	121	1.0	SW
Jackimczyk, Z. J., Wilmington, Vt.	11	12:00	13:00	60	92	..	13
					87		
					82		
Speck, A. W., Martinsburg, W. Va.	11	14:00	16:00	120	165	1.0	1, 3
Watt, Miss M. E., Elmwood, Wis.	11	9:30	13:00	210	173	?	1
Bauer, O. C., and Krueger, W. C., Milwaukee, Wis.	11	12:00	13:00	60	57	..	1, 3
Feinsilber, M. M., Milwaukee, Wis.	11	12:00	13:00	60	57	1.0	1
Hall, L. J., Sarnia, Ontario, Canada	11	10:00	11:30	90	48	1.0	
	12	10:30	16:00	330	194	1.0	
McBean, Mrs. G. A., Montreal, Canada	11	12:00	13:00	60	11	?	

REMARKS.

1. Half-hourly or quarter-hourly totals given. 2. Hourly totals given. 3. More than one observer. 4. Detailed descriptions of meteors given. 5. Watch not continuous. 6. Paths plotted. 7. Observers worked in shifts. Count is therefore for one person. 8. Assistant recorded notes on each meteor. 9. Alternated at observing and recording. Count is therefore for one person. 10. Observed from windows. 11. Observations on August 11 at Truckee, Calif.; on August 12, at Winnemucca, Nevada. 12. Perseids only; some sporadic meteors seen but not counted. 13. Separate observations by three persons.

1932 September 19, Flower Observatory, Upper Darby, Pennsylvania.

Real Paths for Five Meteors

By C. C. WYLIE

To determine the real heights of meteors, simultaneous observations have been made by the University of Iowa Observatory, Iowa City, Iowa, and the Physics

Department of Iowa Wesleyan, Mt. Pleasant, Iowa. The stations are on a north and south line, and 48 miles apart. The Iowa City observer was R. E. Crilley, a graduate student in astronomy at the University of Iowa, and the Mt. Pleasant observer was James A. Van Allen, student assistant in Physics at Iowa Wesleyan.

Wire reticles 35 inches in diameter and covering a circular area of sky 50° in diameter were used. These reticles were constructed by Professor Thomas C. Poulter of the Physics Department of Iowa Wesleyan. It was planned to work two hours on every clear night of the week August 9 to August 16, but only the night of August 9 was reasonably good, and considerable time was lost on that night because of flying clouds. Twenty-seven meteors were observed on the Iowa City reticle between 13:51 and 15:39, and twenty-two meteors were observed on the Mt. Pleasant reticle between 13:36 and 15:36. Five meteors were without doubt observed in duplicate as the magnitudes and the times, recorded to the second, agree and the great-circle test is satisfactorily met. Mr. Van Allen, who was without previous experience in astronomical work, consistently extended his paths a little farther in the direction of the beginning of the meteor than did Mr. Crilley. These were cut off to agree with the plot of the more experienced man, and the observations were reduced by the method of stereographic projections (see these notes for March, 1932).

			Beginning			End			Radiant			
No.	Mag.	C.S.T.	Az.	Dist.	Ht.	Az.	Dist.	Ht.	Length	R.A.	Dec.	Wt.	Rem.
1	3	13:52:26	4°W	28	71	12°W	34	62	11.8	46°	59°	¾	Perseid
2	2.5	13:52:52	17 E	43	74	3 W	34	65	19.2	44	4.5	½	Not Per.
3	2	14:55:21	64 W	35	85	54 W	42	65	21.7	34	66	½	Perseid
4	3	15:00:17	18 W	40	76	24 W	40	58	18.3	20	37	¾	Not Per.
5	1.5	15:39:57	21 W	13	92	19 W	36	55	43.5	40	69	1	Perseid

The times are 90th meridian and noon-to-noon reckoning, and the azimuth and distance are given with respect to Iowa City. The mile is the unit of height, distance, and length. The weights assigned are based on the great-circle test. Meteor No. 3 was off the reticle and consequently a somewhat weak observation, but caught by both observers because of its brightness. It may have been a Perseid in spite of the discordant radiant. As the Perseid radiant was approaching the meridian, and the stations were on a north and south line, the radiants, especially the later, are not so well determined as would otherwise have been the case. The greatest discordance is, as might be expected, in declination.

These observations are much better than plots on star charts by the average graduate student, but it is to be assumed that with more experience, the accuracy will be increased.

University of Iowa, September 19, 1932.

Dubuque Counts of the 1932 Perseids

Students of Columbia College, Dubuque, Iowa, organized several groups in and around Dubuque to keep counts of the Perseids during the height of the shower. The plan was to watch the sky from midnight to dawn every morning of the week from August 6 to 12. Each group was to cover the entire sky and record the total number of Perseids seen by the entire group. In addition one member of the group was to keep a solo count and record only those meteors seen by himself alone. Besides the total count, note was to be taken of the number of meteors which left distinct trains. The count was to be recorded in 15 minute intervals. Practically all the students taking part in this program had had previ-

ous experience in meteor observation.

Cloudy skies prevailed practically the entire week, and on the night of August 10 the sky was completely overcast for almost the entire time. In view of these conditions the counts are scarcely representative and the results only of relative value.

The following is a summary of the results both for the group and for the solo counts. The times are 90th meridian and noon-to-noon reckoning.

SOLO OBSERVATIONS.

1932	Solo Obs.	Began	Ended	Min.	Total Perseids	Leaving Train	Sky Condition
July 30	L.E.	13:15	13:45	30	13	5	1
Aug. 6	A.J.	12:30	13:30	60	35	14	1
6	A.J.	13:30	15:30	120	92	39	2
7	M.P.	12:30	16:00	210	69	..	3
7	L.E.	12:30	15:15	165	127	53	3
7	M.C.	14:00	15:00	60	144	32	1
8	M.C.	12:00	13:30	90	103	22	1
9	M.P.	12:15	13:15	60	9	..	4
9	M.P.	13:15	16:00	165	88	..	1
9	M.C.	12:00	14:30	150	192	46	5
10	M.C.	12:00	12:45	45	23	7	6
11	M.P.	12:15	14:30	135	98	..	8
11	L.E.	12:00	14:45	165	182	101	8
11	M.C.	12:00	13:00	60	109	19	8
11	G.S.	12:15	14:30	135	98	..	8
12	M.P.	12:00	13:15	75	23	..	9
12	M.P.	13:15	15:45	150	128	..	1
12	M.C.	12:00	13:00	60	63	15	9
12	G.S.	12:15	13:15	60	21	..	9
12	G.S.	13:15	16:00	165	129	..	1

SOLO OBSERVERS:

L.E.—Louis Ernsdorff stationed at Bunker Hill golf course west of Dubuque.
A.J.—Alvin Jaeger stationed at Bunker Hill golf course west of Dubuque.
M.P.—Melvin Petry stationed at Eagle Point Park northeast of Dubuque.
M.C.—Michael Cavanaugh stationed at Harper's Ferry, Iowa.
G.S.—Gordon Saunders stationed at Eagle Point Park northeast of Dubuque.

GROUP OBSERVATIONS

1932	Group Obs.	No. in Group	Began	Ended	Min.	Total Perseids	Leaving Train	Sky Condition
Aug. 2	B.H.	3	10:30	11:15	45	38	11	1
6	B.H.	4	12:30	13:30	60	117	19	1
6	B.H.	4	13:30	15:30	120	166	53	2
7	B.H.	6	12:30	16:15	225	226	80	3
7	E.P.	5	12:15	16:00	225	218	..	3
8	P.B.	10	12:00	15:15	195	336	83	1
9	E.P.	5	12:15	13:15	60	30	..	4
9	E.P.	5	13:15	16:00	165	261	..	1
10	E.P.	5	12:00	12:45	45	15	..	7
10	P.B.	10	12:00	12:30	30	45	19	6
11	B.H.	6	12:00	14:45	165	301	130	8
11	E.P.	5	12:15	14:30	135	278	..	8
11	C.A.	3	11:00	14:00	180	220	..	8
12	B.H.	4	11:45	13:15	90	61	33	9
12	B.H.	4	13:15	14:45	90	127	65	1
12	E.P.	5	12:00	13:15	75	92	..	9
12	E.P.	5	13:15	16:00	165	378	..	1

GROUPS OBSERVING:

B.H.—Group at Bunker Hill golf course, Dubuque. Members of group: Louis Ernsdorff, Alvin Jaeger, Leonard Jaeger, Joseph Walters, Robert Ernsdorff, Nicholas Sutton, Robert Kies, Jerome Prendergast, Vincent Mathis.

E.P.—Group at Eagle Point Park, Dubuque. Members of group: Melvin Petry, Gordon Saunders, Herbert Wilging, Robert Becker, Joseph Kirk, Lester Cooling.

P.B.—Boy Scouts at Postville, Iowa. Members of group: Charles Beucher, Dale Peterson, Don Galloway, Murray Ellis, Roland Peterson, Schaefer Cole, William Cole, James Gregg, Robert Burling, Earl Grey.

C.A.—Students from Columbia Academy, Dubuque. Members of group: Charles Tschudi, Harvey Ryan, Melvin Gordon.

SKY CONDITIONS: (1) Sky fairly clear. (2) Sky hazy and partly cloudy. (3) Partly cloudy throughout entire period. (4) Sky hazy till 13:15. Thereafter fairly clear. (5) Sky became hazy at 12:45. No counts after 14:30 on account of clouds. (6) Sky hazy. Quite cloudy after 12:45. (7) Sky very cloudy throughout entire period. (8) Sky somewhat hazy and banked with clouds on horizon up to 13:15. After that clouds came up and by 14:45 obscured sky completely. (9) Moon troublesome.

JOHN A. THEOBALD.

Columbia College, Dubuque, Iowa.

Variable Stars

Monthly Report of the American Association of Variable Star Observers for July, 1932

At this time we usually present a double report covering the months of July and August but as a matter of convenience, both to POPULAR ASTRONOMY and to the Recorder, the present report contains only those observations received up to the first of August. More than three thousand observations are contained herein, but it must be remembered that the previous report closed on or about June 20.

Under GD, representing the Godfrey Club at Watertown, Wisconsin, the following four observers are cited: H. Gaebler, H. Kesting, E. Juenzi, and M. Vore. According to these observers a large sun-spot area was observed on July 8, 9, 10, and 11.

We welcome initial observations from Jack Percival of Tulsa, Oklahoma, and George C. Baldwin of Oklahoma City, Oklahoma. Mr. Arthur W. Beck who was observing at Tucson, Arizona, communicates his latest report from the Chamberlin Observatory at Denver, Colorado, where he has the use of the 20-inch refractor.

Many members of the Association will be located in the path of the coming total eclipse of August 31. Our Secretary, Mr. Olcott, will be at Sugar Hill, New Hampshire; Messrs. Pickering and Yalden with the Recorder near Sanford, Maine; and Mr. Elmer with a group of Long Island enthusiasts at Merry Meeting Lake, New Hampshire. Doubtless many others will also observe this phenomenon but their location has not been made known to the Recorder.

Information just received indicates the probable discovery of another comet by L. C. Peltier of Delphos, Ohio. This makes the third member of our Asso-

Variable Star Observations Received During July, 1932.

May 0 = J.D. 2426828; June 0 = 2426859; July 0 = J.D. 2426889.

J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs.

X And
001046
885 11.0 Jo
889 10.8 Jo
891 10.7 Jo

T And
001726
883 12.2 Jo
887 11.7 Jo
888 11.7 Hu
890 11.9 Hu
893 11.0 Pt
894 11.9 Hu
896 10.8 Hu
914 9.3 Gy

T Cas
001755
860 8.3 Mn
864 8.6 Mn
866 8.6 Jo
869 8.0 Jo
869 8.6 Th
869 8.8 Ah
872 8.6 Th
878 9.0 Th
879 8.9 Jo
879 10.0 Mn
880 9.3 Mc
880 9.6 We
881 9.2 Jo
882 8.7 L
884 9.8 Mn
885 9.4 Jo
886 9.6 Ah
887 9.2 Jo
889 10 Mn
893 10.1 Pt
890 10.0 Mc

R And
001838
865 10.6 Ko
870 11.0 Jo
883 11.3 Jo
886 11.0 Ah
887 11.7 Jo
887 11.2 Ko
891 11.5 Fd
893 11.7 Pt
914[11.8 Gy

S Tuc
001862
841 13.5 Sl
857[12.4 Bl
881[12.4 Bl

S Cet
001909
882 10.6 L
896 10.6 Pt

Y Cep
003179
886 12.4 Me
897 13.0 Fd
897 13.0 Pc

U Cas
004047a
869 9.9 Jo
882 11.3 Me
887 10.4 Jo
889 9.9 L
891 10.2 Fd
893 10.5 Pt

RW And
004132
893[13.1 Pt

V And
004435
889 13.2 L

RV Cas
004746a
893[13.2 Pt

— Cas
004746b
893 10.5 Pt

W Cas
004958
865 9.8 Ko
866 10.0 Jo
869 10.2 Ah
869 10.2 Jo
880 10.4 Ko
881 10.3 Jo
886 10.5 Ah
887 10.1 Jo
888 10.7 Ko
891 10.1 Fd
891 10.5 Jo
893 10.3 Pt
897 10.3 Fd
897 10.0 Pc

U Tuc
005475
841 13.3 Sl
855 13.2 Sl
857 13.0 Bl
865 12.7 Bl
881 11.9 Bl
888 11.4 Bl

Z Cet
010102
882 9.0 L
897 9.6 Pt

U And
010940
889[13.0 L

UZ And
011041
889 13.6 L

S Psc
011208
889 13.6 L

S Cas
011272
865 12.6 Ko
889 12.5 L
893 12.5 Pt

U Psc
011712
896 12.0 Pt

RZ Per
012350
889 14.0 L

R Psc
012502
896 12.4 Pt

RU And
013238
889 12.2 L
896 12.3 Pt

Y And
013338
889[13.9 L
896[13.6 Pt

X Cas
014958
866 11.7 Jo
870 11.6 Jo
873 12.3 Bn
879 11.7 Jo
883 11.8 Jo
885 12.0 Bn
887 11.5 Jo
891 11.5 Jo
891 12.2 Fd
893 12.0 Pt

U Per
015254
870 8.8 Jo
880 9.7 Mc
883 8.8 Jo
883 9.3 Ry
886 9.2 Ah
887 8.7 Jo
890 9.5 Mc
893 8.5 Pt
895 9.3 Ry
901 9.0 Ry
909 9.3 Ry
913 9.1 Ry

S Ari
015912
889 14.0 L

R Ari
021024
889 8.0 L
896 8.4 Pt

W And
021143a
885 8.5 Ah
896 7.2 Pt
914 7.3 Gy

T Per
021258
866 8.7 Jo
869 8.7 Jo
881 9.0 Me
883 8.7 Jo
886 8.9 Ah
889 8.6 Jo
893 8.6 Pt

Z Cep
021281
893[12.5 Pt

o Cet
021403
839 3.5 Sl
853 3.9 Sl
886 6.2 Si
889 5.8 L
897 6.2 Pt

S Per
021558
866 9.7 Jo
869 9.6 Jo
881 9.7 Me
883 9.8 Jo
886 9.6 Ah
889 9.8 Jo
893 8.8 Pt

RR Per
022150
889 13.5 L
893[13.2 Pt

RR Cep
022980
893[12.5 Pt

R Tri
023133
869 8.7 Jo
883 8.9 Jo
887 9.1 Jo
896 9.4 Pt

W Per
024356
865 8.7 Ko
866 8.8 Jo
869 8.8 Jo
869 9.1 Cy
880 9.1 Mc
881 9.5 Me
883 8.8 Jo
883 8.9 Ry
887 8.9 Jo
887 8.8 Ko
890 9.4 Mc

W Per
024356
895 9.0 Ry
896 8.8 Pt
901 9.0 Ry
909 9.0 Ry
913 9.0 Ry

R Hor
025050
825 6.9 Sl
828 6.8 Sl
832 6.3 Ht
841 6.1 Sl
841 6.0 Bl
857 5.6 Bl
865 5.7 Bl

T Hor
025751
825 11.0 Sl
828 11.1 Sl
832 11.8 Ht
841 12.0 Sl
841 12.2 Bl

ρ Per
025938
886 4.1 Si
888 4.1 Si

Y Per
032043
865 9.0 Ko
869 9.2 Jo
883 9.8 Jo
887 10.2 Ko
889 10.0 Jo
896 10.5 Pt

R Per
032335
889 9.9 L
896 10.2 Pt

Nov Per
032443
896 12.5 Pt

T Cam
043065
862 11.3 L
870 11.0 Jo
877 9.7 Be
877 9.8 L
881 9.5 Ko
883 9.3 Jo
887 9.3 Jo
888 9.4 Ko
897 9.4 Pt

R Ret
043263
825 13.2 Sl
841 12.4 Sl
841 12.4 Bl
855 11.7 Sl

R Ret
043263
856 11.8 Ht
857 11.5 Bl
859 11.7 En
865 11.2 Bl
874 10.5 Bl
885 10.4 Bl

X Cam
043274
862 8.5 L
877 10.0 L
877 10.0 Be
880 10.5 Me
897 11.9 Pt

R Dor
043562
825 5.3 Sl
830 5.3 En
832 5.3 Sl
841 5.3 Sl
841 5.5 Bl
849 5.3 En
856 5.4 Ht
857 5.5 Bl
859 5.5 En
865 5.2 Bl
874 5.5 Bl
885 5.4 Bl

R Cae
043738
832[12.0 Ht
841[12.0 Bl

R Pic
044349
834 7.5 En
841 7.9 Bl
850 8.0 En
857 8.6 Bl
865 8.6 Bl
880 8.9 Bl
885 9.2 Bl

R Lep
045514
825 5.6 Sl
852 5.9 Sl

T Lep
050022
841 10.8 Bl

S Pic
050848
834 9.2 En
841 9.2 Bl
850 9.6 En
856 9.8 Ht
857 9.8 Bl
865 9.8 Bl
880 10.4 Bl

VARIABLE STAR OBSERVATIONS RECEIVED DURING JULY, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
R AUR	R OCT	S VOL	RW CAR	R LEO	S CAR
050953	*055686*	*073173*	*091868*	094211	*100661*
896[12.8 Pt	879 11.6 Bl	856 10.5 Ht	856 11.1 Ht	865 7.8 Jo	856 5.5 Ht
T PIC	885 11.7 Bl	857 11.0 Bl	857 11.4 Bl	869 7.9 Jo	859 5.7 Bl
051247	X AUR	859 11.0 En	865 11.7 Bl	881 8.6 Me	865 5.7 Bl
834 8.8 En	060450	865 9.9 Bl	879[12.2 Bl	881 8.8 Pt	879 5.7 Bl
841 9.2 Bl	862 8.8 L	879 9.2 Bl	Y VEL	L CAR	885 5.7 Bl
850 8.8 En	897 8.9 Pt	885 9.0 Bl	*092551*	*094262*	U UMA
857 10.2 Bl	V AUR	W PUP	832[12.9 Ht	825 4.0 Sl	100860
865 10.2 Bl	061647	*074241*	841[12.9 Bl	829 4.1 Sl	814 6.7 Hr
T COL	862 8.5 L	841 12.7 Bl	850[12.9 En	832 4.2 Sl	827 7.0 Hr
051533	AG AUR	849 12.2 En	865[12.9 Bl	839 3.4 Sl	841 6.8 Hr
834 8.2 En	062047	856 11.5 Ht	R CAR	852 3.6 Sl	852 6.9 Hr
841 8.4 Bl	862 9.2 L	857 11.7 Bl	*092962*	Y HYA	860 6.6 Mn
850 8.4 En	NOV PIC	859 11.4 En	825 6.4 Sl	*094622*	864 6.4 Mn
857 9.3 Bl	*062462*	865 10.6 Bl	832 6.1 Sl	834 7.5 En	879 6.4 Mn
859 9.2 En	830 8.6 En	879 9.0 Bl	834 6.6 En	850 7.5 En	884 6.6 Mn
865 9.5 Bl	849 8.5 En	885 9.0 Bi	838 6.2 En	Z VEL	889 6.4 Mn
S CAM	856 8.5 Ht	V CNC	841 5.6 Bl	*094953*	Z CAR
053068	859 8.4 En	081617	849 5.5 En	825 11.9 Sl	*101058a*
897 9.0 Pt	S LYN	865 8.5 L	852 5.5 Sl	832 12.6 Ht	832[12.3 Ht
RU AUR	063558	R CHA	855 5.4 En	833 12.1 En	841[12.6 Bl
053337	862 8.7 L	*082476*	856 5.3 Ht	836 12.3 Sl	850[12.3 En
897[12.4 Pt	877 9.5 Be	825[12.6 Sl	857 5.4 Bl	838 12.5 En	856[12.3 Ht
S COL	877 9.5 L	850[12.4 En	865 5.2 Bl	841 12.4 Bl	859[12.6 Bl
054331	R LYN	856[12.6 Ht	879 4.1 Bl	850 12.8 En	W VEL
830 11.6 En	065355	857[12.6 Bl	885 4.6 Bl	857 12.5 Bl	*101153*
834 11.3 En	888 11.9 L	885[12.6 Bl	Y DRA	865 13.0 Bl	832 9.8 Ht
841 10.2 Bl	Z CMA	U CNC	093178	885[12.8 Bl	834 9.5 En
849 10.0 En	*065911*	083019	866 10.2 Cy	V LEO	838 9.6 En
857 9.4 Bl	825 10.4 Sl	865 12.4 L	868 10.2 L	095421	841 9.0 Bl
859 9.8 En	828 10.3 Sl	X UMA	885 8.7 L	866 10.9 Cy	850 8.7 En
865 9.0 Bl	832 10.3 Sl	083350	R LMI	866 10.3 Jo	855 8.3 En
R COL	838 10.3 Sl	879 14.3 Bk	093934	869 10.4 Jo	856 9.0 Ht
054629	852 10.3 Sl	880[12.5 Pt	866 6.4 Jo	881 11.8 Pt	859 8.2 Bl
830[13.0 En	R VOL	T PYX	867 6.6 Sz	RR CAR	865 8.2 Bl
841[13.0 Bl	*070772*	*090031*	869 6.5 Jo	*095458*	879 8.4 Bl
859[12.5 En	830 11.8 En	857 [t Bl	869 6.5 Je	832 8.4 Ht	885 8.5 Bl
865[12.4 Bl	850 12.0 En	885 [s Bl	870 6.5 Je	834 8.0 En	RZ CAR
α ORI	856 11.8 Ht	V UMA	872 6.5 Je	850 8.0 En	*103270*
054907	859 12.2 En	090151	875 6.7 Ad	856 8.5 Ht	832 13.0 Ht
828 0.2 Sl	L_2 PUP	865 10.3 L	877 6.4 Me	RV CAR	834 13.0 En
U ORI	*071044*	877 10.6 Me	878 6.6 Jo	*095563*	850[12.7 En
054920a	825 4.4 Sl	881 10.7 Sf	878 6.7 Ad	834 11.0 En	856[13.6 Ht
828 10.6 Sl	828 4.3 Sl	886 10.1 L	879 6.8 Wd	838 11.4 En	R UMA
V CAM	832 4.3 Sl	890 10.4 Mc	879 6.7 Sh	841 11.2 Bl	103769
054974	838 4.5 Sl	891 10.6 Sf	879 6.7 Hf	850 11.4 En	857 7.8 Gy
879 14.6 Bk	849 4.8 Sl	W CNC	880 6.6 Pt	856 11.6 Ht	860 7.6 Mn
881 14.7 Bk	852 4.9 Sl	090425	883 6.7 Wd	857 11.6 Bl	861 7.4 Ah
897[12.6 Pt	Z PUP	865 11.9 L	892 7.1 Ad	865 12.0 Bl	864 7.6 Mn
Z AUR	*072820b*	RX UMA	899 7.3 Ad	S CAR	865 7.8 Cy
055353	830 8.0 En	090567	RR HYA	*100661*	866 7.6 Jo
896 9.9 Pt	837 8.0 En	868 10.2 L	*094023*	826 6.1 Sl	867 7.6 Sz
897 10.0 Pt	850 8.3 En	885 10.4 L	834 9.9 En	834 6.0 En	868 7.5 Ah
R OCT	859 8.8 En	RW CAR	838 10.0 En	836 5.8 Sl	869 7.4 Ah
055686	S VOL	*091868*	850 10.0 En	838 6.0 En	869 7.7 Je
838 12.2 Sl	*073173*	834 10.3 En	855 10.1 En	841 5.5 Bl	869 7.5 Jo
841 12.2 Bl	830 11.8 En	838 11.0 En	R LEO	849 5.8 En	870 7.7 Je
857 12.0 Bl	841 11.1 Bl	841 10.9 Bl	094211	852 5.6 Sl	870 7.4 Ah
865 11.9 Bl	850 11.0 En	850 11.4 En	862 8.2 We	855 5.8 En	872 7.6 Je

VARIABLE STAR OBSERVATIONS RECEIVED DURING JULY, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
R UMA	V HYA	W CEN	SS VIR	T UMA	RS UMA
103769	*104620*	*115058*	*122001*	123160	123459
875 7.6 Jo	879 8.9 Bl	834 9.2 En	888 7.9 Sz	884 9.4 Mn	878 11.0 Th
875 7.6 Ah	885 9.0 Bl	838 8.8 En	888 7.1 L	885 9.8 Ah	878 10.4 Cn
875 7.2 Ad	RS HYA	841 8.3 Bl	889 8.1 Mn	886 9.5 Ah	878 10.7 Jo
877 8.0 Wd	*104628*	850 8.3 En	891 7.8 Jo	886 9.5 Th	879 10.8 Mn
878 7.7 Jo	834 13.0 En	855 8.1 En	892 7.9 B	887 9.0 Jo	880 10.9 Me
878 8.1 Cn	841 13.2 Bl	856 8.3 Ht	T CVN	888 9.2 Wd	880 11.0 Pt
878 7.3 Ad	852[12.5 En	859 8.2 Bl	122532	889 9.3 Mn	881 10.8 Ma
879 8.0 Wd	859[13.0 Bl	865 8.2 Bl	862 10.1 Cy	891 9.5 B	883 10.8 Jo
879 7.9 Sh	W LEO	879 9.3 Bl	869 9.7 Th	891 9.1 Fd	883 11.1 Wd
879 7.8 Hf	104814	885 9.0 Bl	869 9.8 Pi	895 9.1 Wd	883 11.2 Ry
879 8.2 Mn	865 14.0 L	R COM	878 9.4 Jo	897 9.1 Pc	884 10.9 Mn
880 7.5 Je	880[13.3 Pt	115919	880 10.2 Pt	897 9.4 Fd	885 11.2 Ah
880 7.7 Mc	RS CAR	862 10.5 Cy	883 9.6 Jo	898 9.1 Hf	885 11.2 Bn
880 7.9 We	*110361*	869 10.8 Ws	888 10.0 Rc	898 9.0 Wd	887 11.1 Jo
880 7.0 Pt	826[12.3 Sl	879 11.6 Bk	889 9.6 Jo	898 9.0 Sh	888 11.4 Wd
881 7.8 Cy	834[12.3 En	880 11.9 Pt	891 9.5 Jo	901 9.1 Wd	889 11.5 Ry
883 7.8 Jo	849[12.1 En	881 11.5 Bk	896 10.1 Rc	901 8.8 Cn	889 11.0 Mn
883 7.4 Ad	S LEO	882 11.4 Me	897 9.6 Fd	913 9.4 Gy	891 11.2 Fd
883 7.9 Wd	110506	SU VIR	897 9.8 Pc	R VIR	894 11.7 Ry
884 8.3 Mn	866 10.5 Cy	120012	Y VIR	123307	895 11.5 Wd
885 7.8 Ah	865 10.3 L	865 11.1 L	*122803*	835 7.8 Rc	897 11.9 Pc
885 7.8 Mc	880 10.8 Pt	880 11.0 Mp	865 12.8 L	850 6.5 Rc	897 11.6 Fd
886 7.9 Me	882 9.8 Me	880 10.5 Pt	881 13.5 Bk	858 7.7 Rc	898 12.2 Wd
886 7.6 Ah	891 10.1 B	881 10.0 Ma	881 12.4 Ma	860 7.5 Mn	901 11.8 Cn
887 7.8 Jo	RY CAR	882 10.3 Me	888[12.9 L	861 7.8 Ah	902 12.2 Ry
888 8.1 Sz	*111561*	885 10.6 L	U CEN	864 7.9 Mn	908 12.4 Ry
888 8.1 Wd	834[13.1 En	892 10.5 B	*122854*	867 7.8 Sz	912 12.5 Ry
888 7.7 Je	841[13.1 Bl	T VIR	832 12.5 Ht	868 9.0 Rc	917 12.8 Ry
889 8.0 Mn	856[13.1 Ht	*120905*	834 12.3 En	868 8.3 Ah	S UMA
890 8.0 Mc	885 13.1 Bl	865 14.2 L	841 12.8 Bl	875 7.5 Ad	123961
891 7.8 Jo	RS CEN	880[12.5 Pt	859 13.0 Bl	877 8.9 Me	860 10.5 Mn
891 8.0 Fd	*111661*	881[14.5 Bk	865 12.8 Bl	879 9.4 Mn	864 10.6 Mn
892 7.5 Ad	834 9.1 En	887 10.7 Bd	880 11.7 Bl	880 8.6 Mc	866 10.7 Jo
893 8.0 B	838 9.1 En	R CRV	885 11.4 Bl	880 9.5 Pt	867 10.6 Pi
895 8.2 Wd	841 9.1 Bl	*121418*	T UMA	880 9.5 Rc	867 10.3 Sz
897 8.1 Hf	849 9.1 En	828 12.0 Sl	123160	881 9.9 Ma	868 10.8 Ah
898 8.1 Hf	855 9.2 En	838 11.8 Sl	860 10.6 Mn	883 9.1 Wd	869 10.7 Jo
898 8.1 Sh	856 9.2 Ht	865 11.2 L	864 10.2 Mn	884 9.5 Mn	870 10.9 Bc
898 8.3 Wd	859 9.6 Bl	866 12.2 Jo	866 9.7 Jo	885 9.3 Mc	874 11.0 Jo
899 7.6 Ad	865 9.7 Bl	867 12.0 Jo	867 10.2 Pi	885 8.9 Jo	877 10.7 Wd
901 8.3 Cn	879 10.1 Bl	880 9.9 Pt	868 10.0 Ah	887 9.0 Jo	878 11.3 Jo
901 8.3 Wd	885 10.1 Bl	880 9.6 L	869 9.8 Ah	888 9.9 Rc	878 10.9 Cn
913 8.8 Gy	X CEN	881 9.3 Me	869 10.0 Jo	889 9.8 Mn	879 10.9 Mn
V HYA	*114441*	884 9.8 Mn	870 9.9 Ah	890 9.6 Mc	880 11.1 Me
104620	832 8.1 Ht	891 7.9 B	870 9.0 Bc	892 10.0 B	880 11.1 Pt
814 8.2 Hr	834 8.4 En	SS VIR	874 9.5 Jo	892 10.3 Rc	881 11.3 Ma
827 8.3 Hr	838 8.0 En	*122001*	876 9.2 Th	896 10.6 Rc	883 11.0 Wd
834 8.0 En	842 7.0 Bl	861 7.2 Ko	877 9.5 Ah	RS UMA	883 11.0 Jo
838 8.2 En	851 7.0 En	865 7.2 L	877 9.4 Wd	123459	884 11.0 Mn
841 7.7 Bl	855 7.0 En	866 7.6 Jo	878 9.6 Cn	860 9.7 Mn	885 11.6 Ah
841 8.1 Hr	859 7.0 Bl	867 7.4 Sz	878 9.3 Jo	864 9.8 Mn	887 11.0 Jo
851 8.3 Hr	865 7.2 Bl	868 7.1 Ko	879 9.9 Mn	865 10.4 Cy	888 11.4 Wd
851 7.9 En	879 8.0 Bl	870 7.6 Jo	880 9.3 Mc	866 10.1 Jo	889 11.2 Mn
854 8.5 Rc	885 7.7 Bl	879 7.7 Jo	880 9.5 Pt	867 10.3 Pi	891 11.3 B
855 8.2 En	AD CEN	880 7.3 Ko	881 9.3 Ma	869 10.2 Jo	891 11.5 Fd
857 8.0 Bl	*114858*	880 7.2 L	881 8.5 We	873 10.5 Bn	895 11.5 Wd
865 7.8 Ko	834 9.1 En	884 8.4 Mn	883 8.9 Jo	874 10.4 Jo	897 11.4 Fd
865 8.7 Bl	856 9.1 Ht	887 7.7 Jo	883 9.4 Wd	877 10.6 Wd	897 11.1 Pc

VARIABLE STAR OBSERVATIONS RECEIVED DURING JULY, 1932.

J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs. J.D.Est.Obs.

S UMA
123961
898 11.5 Wd
901 11.3 Cn
913 11.9 Gy
RU VIR
124204
865 11.0 L
866 11.0 Cy
880 11.2 Pt
880 10.8 L
887 11.0 Me
893 10.8 B
U VIR
124606
865 12.7 L
880 12.5 L
888 12.1 L
894 11.6 B
RV VIR
132012
865[13.8 L
884[14.5 Bk
U OCT
131283
832 11.5 Ht
835 11.9 En
839 12.4 En
842 11.8 Bl
852 12.4 En
859 12.2 Bl
865 12.6 Bl
880 13.3 Bl
V CVN
131546
869 7.3 Th
872 7.4 Th
873 7.4 Th
878 7.5 Th
879 6.9 GD
882 7.0 GD
884 7.4 Th
886 7.1 Th
886 7.2 GD
888 7.4 Th
894 7.2 GD
900 7.5 GD
W VIR
132002
861 10.4 Ko
865 9.5 Ko
868 9.5 Ko
880 10.0 Ko
881 9.6 Bk
882 9.6 Ko
V VIR
132202
881 14.6 Bk

R HYA
132422
828 6.2 Sl
832 6.3 Ht
835 6.6 En
838 6.7 Sl
839 7.0 En
842 6.8 Bl
851 7.5 En
852 7.0 Sl
856 6.9 Ht
859 7.6 Bl
865 7.3 Bl
865 6.6 L
880 7.2 L
880 7.6 Bl
881 7.2 Pt
885 8.0 Bl
S VIR
132706
829 11.5 Sl
832 11.5 Ht
835 11.5 En
839 11.2 En
839 11.3 Sl
851 11.2 En
852 11.2 Sl
856 11.3 Ht
860 11.3 Mn
864 11.2 Mn
867 9.8 Sz
879 9.6 Mn
881 9.4 Pt
882 9.1 Me
884 9.3 Mn
889 8.5 We
893 8.2 B
899 7.4 Ad
RV CEN
133155
835 8.6 En
839 8.6 En
842 9.0 Bl
851 8.7 En
855 9.3 En
856 9.0 Ht
859 9.0 Bl
865 9.4 Bl
880 9.8 Bl
885 9.5 Bl
T UMI
132273
865 13.9 L
888 14.3 L
897[13.8 Fd
T CEN
133633
832 6.6 Ht
835 6.8 En
856 6.5 Sl

T CEN
133633
839 6.4 Sl
842 6.6 Bl
851 6.8 En
852 6.3 Sl
855 6.3 En
856 6.5 Ht
859 6.3 Bl
865 6.4 Bl
880 6.4 Bl
886 6.8 Bl
RT CEN
134236
832 11.4 Ht
835 11.7 En
842 11.4 Bl
851 11.7 En
856 11.7 Ht
859 12.3 Bl
865 12.8 Bl
880 12.7 Bl
886 13.2 Bl
R CVN
134440
869 11.0 Ah
869 11.5 Jo
869 10.9 Pi
869 10.9 Ws
874 11.7 Jo
881 11.0 Pt
887 11.6 Me
913 11.8 Gy
RX CEN
134536
835[13.1 En
842[13.1 Bl
856[13.1 Ht
859[13.1 Bl
886[13.1 Bl
T APS
134677
842[13.2 Bl
852[12.7 En
856[13.2 Ht
865[13.2 Bl
RR VIR
135008
880 11.9 Mp
894 13.0 B
Z BOO
140113
865 14.0 L
881 14.7 Bk
888 13.9 L
Z VIR
140512
865 11.6 L
880 11.0 L
881 10.3 Pt

Z VIR
140512
881 10.4 Me
893 9.9 Rc
893 10.2 B
RU HYA
140528
832 13.2 Ht
842 12.9 Bl
851 12.0 En
856 11.7 Ht
859 11.0 Bl
859 11.0 En
865 10.5 Bl
880 8.9 Bl
886 8.9 Bl
R CEN
140959
835 7.3 En
836 6.7 Sl
839 7.6 En
842 7.5 Bl
849 7.3 En
852 6.7 Sl
856 7.5 Ht
859 7.5 En
865 7.8 Bl
880 7.8 Bl
886 8.0 Bl
U UMI
141567
860 9.1 Mn
862 8.7 We
864 9.2 Mn
865 8.9 Cy
867 9.6 Pi
869 8.7 Jo
869 9.6 Ah
881 10.0 Pt
881 9.7 Sf
883 9.0 Jo
884 9.5 Mn
886 9.9 Ah
887 9.2 Jo
889 9.6 Mn
891 10.0 Sf
897 10.4 Sf
897 10.3 Pc
897 10.4 Fd
S BOO
141954
862 9.0 We
865 9.9 Bd
866 9.1 Jo
868 9.7 L
869 10.6 Ws
869 10.4 Bd
869 10.0 Jo
869 10.0 Pi
878 10.0 Jo

S BOO
141954
880 10.5 Bd
880 10 We
881 10.3 Pt
882 10.6 Bc
882 10.6 Bf
883 10.4 Jo
884 10.6 L
887 10.7 Bd
887 10.7 Jo
891 11.4 Jo
891 11.4 Hu
896 11.9 Hu
899 12.3 Hu
900 12.2 Bg
913[12.0 Gy
RS VIR
142205
865 14.1 L
881[12.8 Md
888 13.6 L
V BOO
142539a
865 9.3 Cy
866 8.7 Jo
868 8.9 Ah
869 8.8 Jo
869 9.1 Pi
877 9.2 Me
879 8.7 Jo
880 8.8 Mc
881 8.8 Cy
881 9.2 Sf
881 9.0 Pt
882 9.1 GD
883 9.0 We
883 8.8 Jo
884 9.1 Mn
885 9.6 Mc
885 9.1 Ah
887 9.1 Jo
889 9.2 Mn
890 9.2 Mc
891 9.0 Jo
891 9.5 Sf
896 9.1 GD
897 9.1 GD
897 9.5 Sf
R BOO
143227
862 9.0 We
866 7.5 Jo
868 8.0 Ah
869 7.7 Jo
869 7.8 Pi
870 8.0 Ah
874 7.1 Ad
875 8.1 Ah

R BOO
143227
877 8.0 Ah
878 7.2 Ad
879 7.3 Jo
880 8.0 Mc
881 7.7 Pt
882 8.0 Bc
882 8.6 Bf
883 7.6 Jo
883 8.1 Wd
885 8.3 Ah
886 8.3 Ah
887 7.6 Jo
891 7.9 Jo
892 7.4 Ad
896 8.6 Hu
898 8.6 Wd
898 8.5 Sh
898 8.6 Hf
899 7.6 Ad
900 8.6 Hu
901 8.8 Wd
V LIB
143417
893[13.2 B
S LUP
144646a
835[12.1 En
851[12.1 En
859[12.1 En
U BOO
144918
866 11.5 Cv
880 12.2 Mp
895 11.2 Bw
898 10.9 Mp
Y LUP
145254
835[13.7 En
842[13.7 Bl
859[13.7 En
865[13.7 Bl
S APS
145971
826[14.0 Sl
841[13.4 Bl
856[13.4 Ht
859[13.4 En
880[13.4 Bl
886[13.4 Bl
RT LIB
150018
881 9.8 Me
881 9.3 Sf
881 9.1 Pt
885 9.6 Jo
888 9.2 Sf
889 9 We
892 9.4 B

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J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
RT LIB	RS LIB	T NOR	R CRB	R CRB	R CRB
150018	*151822*	*153654*	154428	154428	154428
897 9.7 Sf	880 7.7 L	835 9.7 En	868 6.0 L	882 5.7 Pt	893 5.8 Pt
897 9.2 Pr	881 7.6 Me	851 7.5 En	868 5.8 Ko	882 6.0 Pc	893 6.1 Pc
T LIB	886 7.7 Bl	855 7.3 En	869 6.2 Ah	882 6.1 Gy	894 6.0 Hf
150519	888 7.5 L	856 7.2 Ht	869 5.9 Bc	883 5.9 Ad	894 6.2 Hu
865 13.1 L	RU LIB	859 7.5 En	869 6.0 Cy	883 5.8 Pt	895 5.8 Pt
894[13.4 B	*152714*	Z LIB	870 6.1 Ah	883 6.1 Wd	895 5.8 Wd
Y LIB	865 14.0 L	*154020*	870 5.9 Bc	883 6.0 Be	896 6.0 Hu
150605	893 12.0 B	866[12.7 Bl	870 6.0 Jo	883 6.0 Cy	896 5.7 Pt
865 11.0 L	895 11.9 Bw	R CRB	870 6.0 Si	883 6.0 Jo	896 6.1 Pc
869 10.0 Ws	R NOR	154428	871 6.0 Cn	883 6.0 Me	897 6.0 Mg
880 8.2 L	*152849*	791 6.1 Hr	871 6.0 Si	883 6.1 Si	897 5.9 Pt
881 8.3 Pt	835 8.8 En	802 6.2 Hr	872 5.8 Pt	883 6.2 Mg	897 6.1 Pc
881 8.0 Me	842 7.5 Bl	803 6.3 Hr	872 6.0 Be	884 6.1 Mg	898 6.1 Pc
885 8.4 Mg	851 7.3 En	804 6.1 Hr	874 5.9 Ad	884 6.0 Si	898 6.0 Hf
885 8.4 Jo	855 7.5 En	811 6.1 Hr	874 5.9 Bc	884 6.0 L	898 5.9 Wd
888 7.7 L	856 7.5 Ht	814 6.1 Hr	874 6.0 Jo	884 5.8 Me	898 6.0 Mg
889 8.3 We	859 7.3 En	815 6.0 Hr	874 5.9 Me	884 6.0 Ko	899 6.0 Mg
892 7.6 B	865 7.3 Bl	820 6.0 Hr	874 5.9 Bf	884 6.0 Bc	899 6.0 Ad
V CRB	880 7.3 Bl	823 6.1 Hr	875 6.0 Ko	884 6.0 Bf	899 5.9 Hu
151432	887 7.6 Bl	824 6.0 Hr	875 6.0 Si	885 5.9 Mc	900 5.8 Hu
867 7.7 Bc	X LIB	827 6.0 Hr	876 6.0 Si	885 6.2 Ah	900 5.8 Pt
889 7.7 Bc	*153020*	829 6.1 Hr	877 6.1 Si	885 6.0 L	901 5.8 Pt
889 7.5 Bf	842 12.4 Bl	832 6.1 Hr	877 6.1 Ah	885 6.0 Mg	901 6.0 Cn
S LIB	865 13.4 L	835 6.3 Rc	877 6.0 Me	886 6.1 L	902 6.1 Hu
151520	865 13.0 Bl	838 6.0 Hr	877 6.1 Wd	886 6.0 Be	903 6.1 Hu
865 8.5 L	880 13.8 L	841 6.0 Hr	877 6.0 Be	886 5.7 Pt	913 6.1 Gy
880 8.5 L	W LIB	843 6.3 Rc	877 6.0 L	886 6.1 Ah	X CRB
881 8.6 Pt	*153215*	844 6.0 Hr	878 6.0 Cn	886 6.0 Bc	154536
881 8.4 Me	866[13.0 Bl	851 6.0 Hr	878 5.9 Bc	886 5.9 Ko	862 9.9 Cy
885 8.9 Jo	S UMI	854 5.9 Hr	878 5.9 Bf	886 6.0 Me	868 10.8 L
888 8.5 L	153378	857 5.9 Hr	878 6.0 Si	886 6.0 Si	869 10.4 Cy
S SER	861 8.7 Ko	857 6.2 Rc	879 6.0 Si	887 6.0 Si	881 11.6 Ma
151714	862 8.5 We	857 6.0 Gy	879 6.0 Jo	887 5.9 Me	881 11.0 Pt
865 12.5 L	866 8.6 Ko	860 5.8 Ko	879 5.9 Bc	887 6.0 Jo	882 11.4 Me
880 12.2 L	867 8.8 Pi	860 6.0 Si	880 6.5 Je	887 6.0 Bc	884 11.5 L
881 11.8 Pt	868 8.7 Ah	861 6.2 Ah	880 5.9 Mc	887 5.9 Bf	885 11.2 Mg
881 12.4 Md	870 8.7 Ah	861 5.8 Ko	880 6 We	887 5.7 Pt	895 11.9 Bw
881 12.3 Ma	880 8.4 Ko	862 6.2 We	880 6.0 Me	887 6.0 Pc	897 12.4 Mg
885 12.0 Mg	881 8.6 Sf	862 6.0 Cy	880 6.1 Si	888 6.0 L	R SER
888 11.8 L	881 8.0 Pt	862 5.9 Ko	880 6.0 Ko	888 6.1 Mg	154615
S CRB	882 8.4 Gy	862 6.0 Be	880 6.0 Rc	888 6.1 Hu	854 12.2 Md
151731	883 8.8 Jo	862 6.0 L	880 6.0 Mg	888 6.0 Bc	866 12.7 Cy
867 10.5 Bc	884 9.0 Me	864 6.0 Be	880 5.5 Pt	888 6.0 Ko	881 13.4 Pt
881 12.5 Pt	885 8.8 Mg	865 6.0 L	880 5.8 Hu	888 6.0 Me	V CRB
889 10.2 Bf	886 8.7 Ah	865 6.0 Bc	880 6.0 L	888 6.1 Sz	154639
889 10.0 Bc	887 8.7 Ko	865 6.0 Bf	881 6.1 Hu	888 6.0 Si	851 10.6 Md
RS LIB	887 8.6 Jo	865 6.0 Cy	881 5.6 Pt	888 6.0 Rc	862 9.9 Cy
151822	888 8.7 Sf	865 6.0 Jo	881 6.0 Cy	889 6.1 Si	869 9.7 Th
832 11.1 Ht	896 8.6 Bg	865 5.8 Ko	881 5.9 Bc	889 6.2 Bf	872 9.8 Th
838 10.2 En	897 8.6 Sf	866 6.0 Cy	881 6.0 Bf	889 6.0 Bc	878 9.5 Th
839 10.1 En	913 8.9 Gy	866 5.9 Ko	881 6.0 Me	890 6.0 Mc	879 9.6 Md
842 9.6 Bl	U LIB	866 6.0 Be	881 6.0 Si	890 6.0 Bc	881 8.2 Pt
851 9.0 En	*153620a*	866 6.0 L	882 6.0 Cy	890 6.0 Hu	881 8.2 Mp
856 8.3 Ht	866 9.5 Bl	867 6.0 L	882 5.9 Bc	891 5.9 Pt	882 8.9 Me
859 8.6 En	880 9.0 Bl	867 6.0 Cy	882 5.9 Bf	891 6.0 Pc	882 9.5 Md
865 7.7 L	881 9.2 Mp	867 6.0 Pi	882 6.0 Ko	891 6.0 Jo	886 8.5 Th
865 7.8 Bl	887 9.0 Bl	867 6.1 Sz	882 5.8 Me	891 6.0 Hu	886 9.0 Ah
880 7.8 Bl		868 6.1 Ah	882 6.0 Hu	892 5.8 Ad	887 9.2 Md

VARIABLE STAR OBSERVATIONS RECEIVED DURING JULY, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
V CrB	Z Sco	SX Her	W CrB	T Oph	R Dra
154639	*160021*	160325	161138	*162815*	163266
888 9.1 Th	887 10.1 Bl	887 8.8 Ko	883 12.8 Pt	884 12.5 Bk	886 11.0 Ah
888 8.9 Hu	888 10.1 Hu	887 8.2 Pt	W Oph	885 12.8 L	887 9.6 Jo
893 8.3 Md	893 10.3 Rc	888 8.8 L	*161607*	894 13.0 Bw	888 11.0 Wd
894 9.4 Hu	894 10.1 Hu	888 9.2 Me	867 12.5 L	S Oph	889 10.5 Mn
895 8.4 Bw	899 9.7 Hu	888 9.1 Hu	883 13.3 Pt	*162816*	891 9.8 Jo
897 9.0 Mg	900 9.8 Hu	891 8.8 Pt	884 12.1 L	866 11.5 Bl	901 11.6 Wd
R Lib	R Her	893 8.7 Pt	899[11.4 Fr	867 11.3 L	913 11.7 Gy
154715	160118	894 9.3 Hu	V Oph	880 12.0 Bl	RR Oph
865 14.0 L	881[13.1 Pt	895 8.5 Pt	*162112*	888 12.3 Bl	*164319*
868 13.2 B	903[13.1 Bw	896 8.8 Pt	866 7.6 Jo	894 12.7 Bw	860 10.6 Ko
880 12.5 L	913[12.8 Gy	896 9.2 Hu	867 8.1 Sz	W Her	862 10.9 L
881 12.3 Pt	U Ser	897 8.5 Pt	867 7.5 L	163137	865 10.6 Ko
888 12.3 L	160210	900 8.2 Pt	868 8.0 B	861 8.4 Ko	880 11.6 Ko
892 11.8 B	862 8.2 We	901 8.0 Pt	870 7.6 Jo	866 8.2 Ko	880 11.3 L
895 11.7 Bw	866 9.2 Cy	W Sco	879 7.8 Jo	869 8.5 Th	883 11.4 Pt
R Lup	869 7.9 Bc	*160519*	880 7.8 Hu	872 8.7 Th	886 11.8 Me
154736	869 8.0 Bf	842[13.8 Bl	881 7.6 Hu	873 8.5 Th	888 11.8 Ko
829 13.8 S!	878 8.9 Bc	866[13.4 Bl	883 7.5 Pt	876 8.6 Th	897 12.4 Mg
851[12.0 En	878 8.9 Bf	881 14.9 Bk	884 7.4 L	878 8.6 Th	S Her
RR Lib	880 9.2 We	884[14.8 Bk	889 7.6 Jo	878 9.0 Sf	164715
155018	881 9.3 Cy	RU Her	896 7.7 Hu	880 8.8 Ko	861 9.4 Ah
867 8.2 L	891 9.6 Pt	160625	900 7.8 Hu	882 9.0 Me	868 9.6 Ah
880 8.0 L	883 9.2 Wd	862 12.5 Cy	U Her	882 9.2 Sf	869 9.4 Jo
881 8.5 Ma	886 9.7 Me	867 12.4 L	162119	883 8.9 Pt	883 9.8 Jo
881 7.9 Pt	888 9.9 Hu	877 10.5 Ah	866 11.4 Cy	884 8.8 Th	883 10.3 Pt
882 7.9 Me	894 10.2 Hu	880 12.2 Me	866 10.7 Jo	886 9.0 Th	886 10.5 Me
888 8.3 Hu	901 10.0 Wd	880 12.1 L	868 11.4 B	887 9.2 Ko	886 10.5 Ah
895 9.1 Bw	X Sco	881 12.3 Pt	869 11.7 Jo	888 9.3 Th	887 10.3 Jo
899 9.0 Hu	*160221a*	896 11.8 Hu	878 11.7 Jo	888 9.4 Sf	891 10.5 Jo
Z CrB	866 12.8 Bl	897 11.2 Mg	883 11.7 Jo	888 9.5 Hu	894 10.4 Hu
155229	867 13.0 L	R Sco	883 12.0 Pt	892 9.4 Sf	RS Sco
867 14.5 L	880 12.4 L	*161122a*	884 11.6 Me	894 9.4 Hu	*164841*
897 14.5 Mg	880 12.3 Bl	832 12.6 Ht	887 12.0 Jo	897 9.5 Sf	832 7.7 Ht
RZ Sco	888 11.9 Bl	842 13.4 Bl	890 12.0 Hu	R UMi	835 7.8 En
155823	SX Her	856[12.6 Ht	899 11.5 Hu	163172	852 9.0 En
832 12.4 Ht	160325	866[13.4 Bl	913[12.3 Gy	865 9.0 Jo	855 9.0 En
835 12.0 En	861 8.2 Ko	883[12.8 Pt	Y Sco	867 9.3 L	856 9.6 Ht
851 12.0 En	865 8.0 Ko	884 14.8 Bk	*162319*	870 8.8 Jo	866 9.6 Bl
856 12.3 Ht	867 8.3 L	S Sco	897[11.8 Mg	880 9.7 Me	880 10.2 Bl
870 11.5 Jo	868 8.3 Ko	*161122b*	SS Her	881 9.2 Bc	888 10.3 Bl
881 10.4 Pt	872 8.3 Pt	832 11.7 Ht	162807	885 9.2 L	898 10.9 Mg
881 10.5 Mp	874 8.7 Me	835 11.5 En	862 10.6 Cy	887 9.4 Jo	RR Sco
881 10.7 Me	877 8.7 Me	842 11.4 Bl	866 11.0 Jo	R Dra	*165030a*
Z Sco	880 8.5 Ko	851 10.8 En	867 10.2 L	163266	831 11.0 Sl
160021	880 8.5 Me	855 10.5 En	868 11.1 B	860 8.4 We	832 11.2 Ht
832 11.3 Ht	880 8.2 Pt	856 10.2 Ht	869 11.0 Th	860 9.2 Mn	835 11.4 En
835 10.9 En	881 8.7 Me	866 10.7 Bl	869 10.0 Bc	864 9.6 Mn	839 11.2 Sl
842 10.8 Bl	882 8.8 Ko	867 12.0 Jo	878 11.8 Jo	865 9.6 Jo	852 12.1 En
851 10.7 En	882 9.2 Me	880 12.0 Bl	880 11.6 L	860 9.9 Ah	852 11.7 Sl
855 10.6 En	882 8.3 Pt	883 12.0 Pt	881 11.5 Sf	870 9.5 Jo	856 11.7 Ht
856 10.7 Ht	883 8.4 Pt	884 11.8 Bk	883 11.9 Pt	877 10.7 Wd	866 11.8 Bl
866 10.6 Bl	883 8.2 Jo	886 11.9 Me	888 11.6 L	879 10.2 Mn	880 11.5 Bl
867 10.5 L	883 9.3 Me	888 12.1 Bl	T Oph	880 10.8 Me	888 11.4 Bl
880 10.6 Bl	884 9.4 Me	W CrB	*162815*	881 11.1 Ma	SS Oph
881 10.3 Mp	884 8.7 Ko	161138	866 11.9 Bl	882 11.1 Gy	*165202*
881 10.5 Me	886 8.3 Pt	851 11.2 Md	867 11.8 L	883 11.1 Pt	851 9.1 Md
883 9.8 Jo	886 8.9 Me	865 10.5 Bf	880 12.4 Bl	883 10.8 Wd	867 7.3 Md
884 10.3 L	887 9.0 Me	865 10.7 Bc	883 12.4 Pt	884 10.4 Mn	869 9.3 Md

VARIABLE STAR OBSERVATIONS RECEIVED DURING JULY, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
SS OPH	α HER	RT SER	V DRA	W LYR	X OPH
165202	171114	*173411*	175654	181136	183308
881 9.8 Md	888 3.2 Si	868 12.9 L	887 10.5 Md	865 12.0 Jo	882 7.6 Hu
883 9.5 Pt	889 3.3 Si	RU SCO	893 9.8 Md	872 12.7 Be	883 7.5 We
885 9.8 Md	Z OPH	*173543*	872 12.6 L	883 7.7 Jo	
886 9.5 Me	171401	837 11.0 En	R PAV	879 12.3 Jo	883 7.7 Pt
888 10.4 Md	861 9.5 Ah	852 12.0 En	*180363*	880 12.0 B	884 7.8 Si
RV HER	869 9.3 Ah	866 11.7 Bl	832 7.5 Ht	883 12.0 Jo	884 8 Mn
165631	869 9.1 Th	880 11.0 Bl	837 7.8 En	883 12.1 Pt	884 7.3 L
868 10.1 B	870 9.2 Ah	888 10.8 Bl	853 8.2 En	883 11.8 Wd	885 8.1 Ah
868 9.9 L	870 8.7 Jo	SV SCO	856 8.3 Ht	886 11.2 Ah	887 7.4 Jo
869 9.8 Jo	872 9.3 Th	*174135*	859 8.4 En	888 11.7 Wd	887 7.6 Ko
881 10.3 Md	878 8.5 Th	837[12.2 En	T HER	888 11.7 L	888 8.0 Si
883 9.7 Pt	883 8.0 Pt	866[12.2 Bl	180531	895 11.2 Wd	883 7.6 Hu
883 9.6 Jo	884 8.2 Th	W PAV	861 8.8 Ah	897 10.6 Sf	889 8.0 Mn
884 9.6 L	885 8.5 Ah	*174162*	863 8.1 We	901 10.2 Wd	889 8.0 Si
887 9.9 Jo	886 8.1 Th	832 10.3 Ht	865 8.7 Jo	RV SGR	891 7.7 Jo
888 10.2 Me	888 8.1 Th	837 10.4 En	868 8.8 L	*182133*	892 7.4 Ad
RT SCO	888 8.6 Hu	841 10.7 Sl	868 9.1 Ah	837 11.6 En	894 7.5 Hu
165636	896 7.8 Pr	853 10.9 En	870 9.0 Jo	853 12.3 En	899 7.5 Ad
866[14.0 Bl	RS HER	856 11.1 Ht	870 9.4 Bc	866 12.3 Bl	900 7.4 Hu
R OPH	171723	866 11.5 Bl	878 9.6 Cn	880 13.0 Bl	902 7.5 Hu
170215	861 10.8 Ah	880 12.5 Bl	880 10.0 Me	888 13.3 Bl	RY LYR
862 13.4 L	869 10.5 Ah	888 12.9 Bl	880 9.7 B	SV HER	184134
883 12.9 Pt	883 9.3 Md	RS OPH	881 9.7 Bc	182224	868 13.0 L
884 13.1 L	883 9.0 Pt	*174406*	881 9.8 Bf	888 14.2 Bk	886 13.0 Pt
887 12.0 Bf	885 8.7 Jo	883 11.0 Pt	883 10.5 Pt	888 14.0 L	888 13.5 Bk
887 12.0 Bc	886 9.2 Ah	U ARA	884 10.0 L	T SER	R SCT
913[12.0 Gy	887 9.1 Md	*174551*	886 10.9 Bc	182306	*184205*
RT HER	887 8.7 Jo	832 10.8 Ht	886 10.8 Ah	866 9.9 Jo	831 5.3 Sl
170627	893 9.3 Md	837 11.4 En	890 10.0 Hu	870 10.0 Jo	839 5.5 Sl
865 11.0 Ko	899 8.4 Mg	853 12.5 En	894 10.2 Hu	879 10.0 Jo	854 5.8 Hr
869 10.8 Th	S OCT	856 12.5 Ht	901 11.2 Cn	883 10.4 Pt	856 5.3 Sl
878 9.9 Th	*172486*	RT OPH	W DRA	887 10.2 Jo	857 5.8 Hr
880 10.3 Ko	829 11.4 Sl	175111	180565	891 10.6 Jo	857 5.8 Gv
883 9.8 Jo	832 11.7 Ht	883 10.1 Pt	880 9.2 L	894 10.7 B	860 5.5 Si
883 10.9 Pt	839 12.0 Sl	T DRA	883 9.3 Pt	SV DRA	862 5.3 Cy
886 9.4 Th	839 11.6 En	175458a	883 9.0 Md	183149	864 5.0 Bc
886 9.9 Me	852 12.5 En	879 12.7 Mg	886 9.3 Me	888 11.0 L	864 5.0 Bf
887 9.7 Ko	866 12.9 Bl	UY DRA	887 9.1 Md	RZ HER	865 5.0 Bf
887 9.6 Jo	880 13.3 Bl	175458b	888 9.6 Bk	183225	865 5.0 Bc
887 9.5 Bc	888 13.4 Bl	899 10.9 Mg	893 9.0 Md	883 12.3 Md	866 5.5 Bc
887 9.5 Bf	RU OPH	RY HER	X DRA	888 14.4 Bk	866 5.2 Cy
888 9.3 Th	172809	175519	180666	X OPH	867 5.5 Bc
888 9.8 Hu	851 11.9 Md	839 9.2 Md	888 14.4 Bk	183308	867 5.8 We
891 9.5 Jo	867 10.5 Md	868 10.7 L	181103	860 7.0 Ko	867 5.1 L
894 10.5 Hu	868 11.4 L	883 11.9 Pt	RY OPH	866 7.3 Jo	869 5.2 Jo
899 9.1 Mg	879 10.0 Md	883 12.0 Md	831 8.5 Sl	868 7.2 Ko	869 5.7 Bc
RW SCO	880 9.8 L	884 12.0 L	839 8.1 Sl	868 7.0 L	869 5.8 Bf
170833	881 10.6 Ma	885 11.8 Md	854 8.0 Md	869 7.7 Ah	870 5.5 Bc
837[12.5 En	882 10.0 Md	887 11.5 Md	856 8.0 Sl	869 7.4 Jo	870 5.1 Si
852[12.5 En	883 9.5 Pt	888 12.0 Me	867 9.2 Md	870 7.5 Jo	872 5.8 Je
866[12.5 Bl	885 9.9 Md	889 12.0 Mp	868 9.3 Ah	875 7.4 Ad	874 5.9 Bc
880[13.0 Bl	888 9.6 L	893 12.2 Md	879 10.5 Md	878 7.4 Ad	874 5.9 Me
888[13.0 Bl	890 9.6 Md	V DRA	880 10.5 B	879 7.7 Jo	875 5.3 Ad
α HER	894 9.6 B	175654	883 10.5 Md	880 7.6 Ko	877 5.8 Me
171114	899 9.7 Mg	879 11.0 Md	883 10.9 Pt	880 8.3 Si	877 5.9 Mg
884 3.3 Si	913 9.7 Gy	880 11.1 L	885 10.9 Md	880 7.5 Hu	878 6.0 Ad
886 3.5 Si		882 10.7 Md	886 11.0 Ah	881 7.8 Hu	879 5.7 Jo
887 3.1 Si		883 10.4 Pt	889 10.7 Jo	881 8.3 Si	879 6.0 Wd
			890 12.0 Md		

VARIABLE STAR OBSERVATIONS RECEIVED DURING JULY, 1932.

J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.
R SCT			R SCT			RX LYR			SU SGR			S LYR			RY SGR		
184205			*184205*			185032			*185722*			190925			*191033*		
879	6.1	Sh	888	6.0	Je	886[	13.0	Pt	832	8.3	Ht	868	13.8	L	880	7.2	Bl
879	6.1	Hf	888	6.9	Wd	888[	15.0	Bk	RT LYR			888	14.1	Bk	881	7.3	Pt
880	5.5	Je	888	6.3	Bg	R LYR			185737			X LYR			882	7.1	Pt
880	6.1	Mc	889	6.2	Mn	185243			888	14.9	Bk	190926			882	7.1	L
880	6.1	We	889	6.3	Bf	860	4.1	Si	V AQL			886	9.5	Pt	883	7.3	Pt
880	6.1	Me	889	6.0	Jo	870	4.1	Si	*185905*			RS LYR			886	7.2	Me
880	5.8	Si	889	6.3	Bc	871	4.1	Si	884	7.8	Mn	190933a			886	7.3	Pt
880	5.9	Mg	889	6.5	Si	876	4.2	Si	889	7.8	Mn	886[	12.7	Pt	887	7.4	Pt
880	6.5	Hu	890	6.4	Mc	878	4.2	Si	897	7.2	Fd	914[	12.5	Gy	888	7.1	Bl
880	5.8	Pt	890	6.6	Hu	879	4.2	Si	R AQL			RU LYR			891	7.3	Pt
880	5.8	L	891	6.5	Jo	880	4.1	Mc	190108			190941			893	6.8	Pt
881	6.0	Ma	891	6.2	Fd	881	4.8	Si	860	8.5	Ko	886[	12.3	Pt	895	7.2	Pt
881	6.0	Bf	891	7.1	Hu	883	4.1	Si	861	9.0	Ah	U DRA			896	6.9	Pt
881	6.3	Cy	891	6.3	Pt	885	4.3	Si	865	8.1	Ko	190967			897	7.0	Pt
881	5.9	Bc	891	6.5	Pc	885	4.2	Mc	866	8.0	Jo	868	9.6	L	898	7.1	Mg
881	6.1	Me	892	6.9	Ad	886	4.1	Si	868	8.4	Ah	872	10.4	Be	900	6.8	Pt
881	5.8	Si	893	6.2	Pt	887	4.2	Si	869	8.5	Ah	872	10.3	L	901	6.7	Pt
881	6.4	Ad	894	6.4	Hu	888	4.2	Si	869	8.2	Jo	881	9.9	Sf	TY SGR		
881	6.2	Hu	894	6.3	GD	889	4.4	Si	870	8.4	Ah	886	9.7	Pt	*191124*		
881	6.0	Pt	895	6.2	Pt	896	4.2	Mc	875	8.2	Ah	888	9.7	Sf	853[	12.4	En
882	6.1	Pt	895	7.0	Wd	S CRA			879	7.8	Jo	897	9.5	Sf	866[	12.4	Bl
882	6.0	Bf	896	7.3	Hu	*185437a*			880	8.0	Me	W AQL			S SGR		
882	6.2	Cy	896	6.5	Pt	831	12.0	Sl	880	7.4	Ko	*191007*			*191319a*		
882	6.0	Bc	896	6.7	Pc	832	11.5	Ht	883	7.6	Jo	882	9.2	Me	858	11.8	En
882	6.1	Me	896	6.7	GD	839	12.5	Sl	884	7.6	Mn	868	8.7	L	866	11.5	Bl
882	6.2	Hu	896	6.7	Pr	853	11.5	En	885	7.7	Ah	880	9.1	L	872	11.8	L
882	6.1	GD	897	7.0	Mg	856	12.1	Sl	886	7.8	Ah	886	9.0	Pt	872	11.5	Be
882	6.1	Gy	897	6.8	Hf	859	12.0	En	886	7.0	Pt	887	9.4	Me	880	10.9	Bl
883	6.3	Wd	897	7.0	Pt	866	12.0	Bl	887	7.6	Jo	T SGR			882	11.1	Me
883	6.4	Cy	897	6.6	GD	880	11.5	Bl	887	7.4	Ko	*191017*			884	10.8	L
883	6.1	Jo	898	7.0	Wd	888	11.5	Bl	889	7.5	Mn	886	11.5	Pt	886	10.7	Pt
883	6.1	Me	898	6.9	Sh	ST SGR			891	7.5	Jo	888	11.5	Me	888	10.9	Bl
883	5.8	Si	898	6.9	Hf	*185512a*			V LYR			891	11.6	Pc	894	11.3	Hu
883	6.0	Mg	899	7.2	Ad	888	15.0	Bk	190529a			894	11.5	Hu	896	10.9	Hu
883	6.2	Ad	899	7.4	Hu	R CRA			879[	12.3	Md	896	11.6	Hu	899	10.9	Hu
883	6.1	Pt	900	7.3	Hu	*185537a*			886[	12.0	Pt	R SGR			Z SGR		
884	6.1	Bf	900	7.0	Pt	831	11.9	Sl	RX SGR			*191019*			*191321*		
884	6.1	Bc	900	6.9	GD	832	12.1	Ht	*190818*			832[	11.5	Ht	856[	12.4	En
884	5.8	Si	901	6.9	Pt	839	12.1	Sl	832	11.2	Ht	858[	12.1	En	888	15.0	Bk
884	6.0	Mn	901	6.8	Cn	853	11.7	En	859	12.0	En	872	12.5	L	SW SGR		
885	6.4	Mc	902	7.0	Hu	856	11.9	Sl	886[	12.4	Pt	886	11.7	Pt	*191331*		
886	6.1	Bc	913	7.0	Ma	859	11.9	En	RW SGR			891	11.8	Pc	856	12.1	En
886	6.4	Me	913	7.1	Gy	866	12.5	Bl	*190819a*			896	11.7	Hu	866	13.1	Bl
886	5.8	Si	914	7.1	Gy	880	12.8	Bl	832	9.5	Ht	RY SGR			880	12.9	Bl
886	6.1	Pt	RW LYR			888	13.0	Bl	858	9.7	En	*191033*			TZ CYG		
886	6.4	GD	184243			T CRA			872	9.7	L	830	7.8	Sl	191350		
887	6.3	Bg	872	9.7	Be	*185537b*			885	9.7	L	832	7.8	Ht	886	10.8	Pt
887	6.2	Bf	894	12.1	B	831	13.1	Sl	886	9.7	Pt	835	7.7	En	U LYR		
887	6.2	Bc	Nov AQL			839	13.0	Sl	888	9.6	Me	839	7.7	En	191637		
887	6.5	Me	184300			856	13.1	Sl	TY AQL			842	7.6	Bl	865	11.9	Jo
887	6.3	Si	866	10.8	Jo	866	13.0	Bl	*190907*			853	7.3	En	883	11.8	Jo
887	6.2	Pt	879	11.0	Jo	880	13.0	Bl	882	10.3	Me	855	7.1	En	886	11.5	Pt
888	6.5	Hu	881	11.8	Pt	888	12.9	Bl	883	10.4	Me	856	7.5	Ht	891	11.5	Jo
888	6.3	Si	886	11.5	Pt	Z LYR			884	10.4	Me	856	6.7	Sl	AF CYG		
888	6.5	Bc	891	11.4	Pt	185634			886	10.3	Me	857	7.3	Bl	192745		
888	6.3	Me	891	11.3	Jo	872	13.0	Be	886	10.6	Pt	859	6.9	En	861	7.0	Ah
888	6.5	Bf	900	11.6	Pt	872	13.1	L	887	10.0	Me	866	7.1	Bl	868	7.2	Ah
888	6.0	Mg				886	12.5	Pt	888	10.2	Me	867	7.1	L	869	7.3	Ah

VARIABLE STAR OBSERVATIONS RECEIVED DURING JULY, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
AF CYG	RT CYG	RU SGR	S AQL	RS CYG	R DEL
192745	194048	*195142*	200715a	200938	201008
870 7.2 Ah	886 6.8 Pt	853 12.1 En	883 9.1 Jo	877 7.5 Ah	886 11.1 Ah
877 6.9 Ah	887 7.0 Jo	866 12.4 Bl	885 9.4 Ah	877 8.1 Si	887 11.3 Ko
885 7.3 Ah	890 7.3 Mc	881 13.0 Bl	887 9.3 Jo	877 7.8 Wd	887 11.2 Pt
886 7.2 Ah	892 6.9 Ad	888 13.4 Bl	887 9.2 Pt	878 8.3 Si	891 11.3 Sf
TY CYG	898 7.2 Wd	RR AQL	890 9.6 Bg	878 7.4 Ad	891 10.6 Jo
192928	898 7.2 Sh	*195202*	894 9.6 Bg	879 8.0 Si	896 10.9 Pc
880 12.2 L	898 7.2 Hf	868 12.3 L	897 9.7 Bg	879 7.7 Wd	897 11.0 Sf
886 12.0 Pt	899 6.6 Ad	884 12.4 L	RW AQL	879 8.4 Sh	SX CYG
RT AQL	901 7.2 Wd	RS AQL	200715b	879 7.2 GD	201130
193311	914 6.7 Gy	195308	866 9.8 Jo	879 8.4 Hf	865 10.5 Cy
868 8.3 L	TU CYG	882 13.2 L	869 9.5 Jo	880 8.1 Si	880 10.8 Me
870 8.9 Ah	194348	NOV CYG	874 9.4 Jo	880 7.6 Me	883 11.2 Cy
876 8.8 Th	866[11.7 Ry	195553	881 9.0 Bg	880 7.8 Hu	887 11.3 Pt
878 8.8 Th	885[13.6 L	881[12.2 Pt	883 9.5 Jo	881 8.2 Cv	894 11.5 Bg
884 8.9 L	892[12.8 Ry	893[12.2 Pt	887 9.6 Jo	881 8.3 Si	RT SGR
885 9.2 Ah	896[12.8 Bg	RR TEL	889 9.5 Pt	881 7.6 Hu	*201139*
886 9.0 Pt	901[12.8 Ry	*195656*	890 9.3 Bg	882 7.5 Hu	881 10.0 Bl
R CYG	904[12.5 Ry	832[12.6 Ht	894 9.1 Bg	882 7.3 GD	888 10.3 Bl
193449	910[12.8 Ry	854[12.6 En	897 9.1 Bg	883 7.4 Jo	WX CYG
886 12.8 Pt	914 13.1 Ry	Z CYG	R TEL	883 7.5 Ad	201437b
897 13.7 Pc	917 12.8 Ry	195849	*200747*	883 7.6 Wd	865 11.0 Cy
897 13.8 Fd	X AQL	865 9.2 Jo	881 12.7 Bl	884 8.0 Si	865 9.9 Jo
914[11.9 Gy	194604	868 8.9 L	888 12.7 Bl	885 7.8 Ah	868 10.3 L
RV AQL	880 13.0 L	870 8.8 Jo	RU AQL	886 8.0 Sh	869 10.3 Jo
193509	886 12.7 Pt	872 8.7 Th	200812	886 7.4 L	874 10.5 Jo
868 9.3 L	896 12.2 Pc	873 8.6 Th	880 12.7 L	887 7.5 Jo	878 10.7 Jo
884 9.0 L	χ CYG	874 8.7 Jo	896 13.2 Bg	887 7.3 Pt	883 10.4 Jo
886 9.3 Pt	194632	878 8.6 Jo	W CAP	888 7.5 Hu	883 10.8 Md
888 9.1 Hu	869 11.0 Jo	885 8.6 Jo	*200822*	888 8.0 Si	883 11.0 Cy
894 9.4 Hu	874 11.0 Jo	886 8.8 Pt	881[12.8 Bl	888 8.0 Hf	886 10.8 Ah
900 9.4 Bg	878 10.8 Jo	886 8.5 L	887[12.5 Pt	888 7.2 Je	887 10.4 Jo
T PAV	881 12.8 Bg	887 8.6 Jo	Z AQL	889 8.0 Hf	887 10.8 L
193972	883 12.7 Wd	888 8.9 Th	*200906*	889 8.3 Si	889 11.1 Md
837[12.1 En	883 10.6 Jo	S TEL	887 12.0 Pt	891 7.5 Jo	891 10.5 Jo
856[13.2 Ht	885 12.0 Ah	*195855*	894 10.8 Bg	892 7.6 Ad	900 10.3 Bg
866[13.2 Bl	886 12.3 Pt	841 13.2 Sl	R SGE	894 7.4 GD	V SGE
RT CYG	887 10.7 Jo	881 13.1 Bl	200916	894 8.2 Hf	201520
194048	891 10.8 Jo	SY AQL	866 9.2 Jo	895 8.2 Wd	880 11.6 Me
865 8.2 Jo	891 12.2 Pc	200212	869 9.3 Jo	897 8.2 Hf	881 11.6 Me
868 8.5 Ah	894 12.3 Bg	887[12.5 Pt	874 9.4 Jo	898 8.2 Wd	882 11.7 Me
869 8.4 Ah	895 12.3 Wd	896[12.7 Bg	880 9.5 Me	898 8.3 Hf	884 11.8 Me
869 7.9 Jo	896 12.0 Pc	914[11.9 Gy	883 9.2 Jo	898 8.2 Sh	886 11.5 Me
870 8.3 Ah	897 12.2 Bg	S CYG	887 9.1 Jo	899 7.5 Ad	888 11.2 Me
874 7.6 Jo	901 12.0 Wd	200357	RS CYG	900 7.5 Hu	894 10.6 Bg
875 7.5 Ad	914 11.3 Gy	887[12.4 Pt	200938	900 7.5 GD	U CYG
875 8.2 Ah	S PAV	894[13.3 Bg	814 7.1 Ad	R DEL	201647
877 7.9 Ah	*194659*	R CAP	825 7.0 Ad	201008	860 8.7 Mn
877 7.6 Wd	837 8.2 En	*200514*	832 7.1 Ad	865 11.8 Ko	861 7.8 Ah
878 7.3 Ad	841 7.0 Sl	882 13.2 L	861 7.2 We	866 11.0 Jo	861 6.5 We
878 7.7 Jo	854 7.5 En	887 13.0 Pt	862 7.3 Cy	867 11.7 Cy	864 8.8 Mn
880 7.9 Mc	RR SGR	896 12.2 Pc	865 7.2 Jo	868 12.1L	865 7.6 Jo
881 7 We	*194929*	S AQL	868 7.3 L	869 11.5 Ah	868 8.0 Ah
883 6.9 Jo	866 11.9 Bl	200715a	869 7.3 Jo	869 11.3 Jo	869 7.8 Jo
883 7.5 Wd	880 12.5 Bl	866 9.0 Jo	869 7.2 Je	874 10.9 Jo	872 7.8 Je
884 7.2 Me	888 12.5 Bl	869 9.2 Jo	871 8.0 Si	878 10.7 Jo	874 7.7 Jo
885 7.4 Mc	RU SGR	874 9.1 Jo	872 7.2 Je	882 11.4 Ko	875 6.8 Ad
885 7.2 Ah	*195142*	880 9.3 Me	874 7.3 Jo	884 11.5 L	877 8.4 Wd
886 7.3 Ah	832 10.9 Ht	881 8.9 Bg	875 7.2 Ad	886 11.3 Me	878 6.9 Ad

VARIABLE STAR OBSERVATIONS RECEIVED DURING JULY, 1932.

J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.	J.D.Est.Obs.
U CYG	ST CYG	X DEL	T CEP	W CYG	R GRU
201647	202954	205017	210868	213244	*214247*
878 8.0 Jo	894 12.5 Bg	887 9.9 Pt	864 9.4 Mn	867 5.9 L	881[12.9 Bl
879 8.5 Wd	V VUL	888 10.8 Hu	867 8.8 Jo	878 6.1 Si	V PEG
879 8.4 Sh	203226	894 10.1 Hu	868 9.3 Ah	880 6.5 Mc	215605
879 8.4 Hf	887 8.6 Pt	894 9.8 Bg	869 9.4 Th	881 6.0 Si	889 13.8 L
879 8.8 Mn	R MIC	900 9.8 Hu	869 9.4 Jo	882 5.9 L	891 13.2 Pt
879 7.8 GD	*203429*	T OCT	872 9.5 Th	884 6.3 Si	U AQR
880 7.7 Je	881[12.8 Bl	*205782*	877 9.5 Wd	885 6.6 Mc	*215717*
880 8.7 Mc	V DEL	829 9.6 Sl	878 9.5 Th	886 6.1 Si	867 11.1 L
880 8.2 Me	203611	R VUL	878 9.2 Jo	887 6.1 Si	891 11.7 Pt
882 8.4 Sf	882 13.4 L	205923a	879 9.7 Wd	888 6.1 Si	RY PEG
882 7.7 GD	S DEL	861 8.6 Ah	879 9.7 Sh	889 6.3 Si	220133a
883 7.7 Jo	203816	866 7.8 Jo	879 9.6 Hf	890 6.4 Mc	891 9.0 Pt
883 8.4 Wd	880 11.5 Me	868 8.3 Ah	879 9.8 Mn	S CEP	RZ PEG
884 8.9 Mn	887 12.0 Pt	869 8.3 Ah	882 9.9 Gy	213678	220133b
885 8.8 Mc	894 10.9 Hu	869 7.8 Jo	882 9.7 Sh	865 11.4 Cy	880 8.2 L
885 7.9 Ah	896 10.8 Hu	870 8.2 Ah	882 9.8 We	867 11.3 Jo	T PEG
886 8.7 Sh	896 11.3 Bg	875 8.1 Ah	883 9.6 Wd	869 11.4 Jo	220412
887 8.0 Jo	V CYG	879 7.8 Jo	883 9.4 Jo	881 11.9 Md	880 10.9 L
887 7.9 Pt	203837	882 8.1 Mc	884 9.9 Mn	885 11.8 Mg	903 12.2 Bw
888 7.8 Je	868 13.5 L	883 7.8 Jo	884 9.5 Th	888 12.2 Md	Y PEG
888 7.8 Md	887 12.9 Pt	885 8.4 Ah	885 9.7 Ah	891 11.9 Pt	*220613*
888 8.7 Si	897 13.1 Pc	886 8.4 Ah	887 9.5 Jo	893 11.8 Md	891 11.6 Pt
888 8.6 Hf	897 13.3 Fd	887 7.8 Jo	888 9.8 Si	RU CYG	RS PEG
889 9 Mn	Y AQR	887 8.2 Pt	888 10.1 Th	213753	220714
889 8.7 Si	*203005*	888 8.0 Hu	888 9.6 Wd	861 8.6 Ah	882 13.5 L
890 8.9 Mc	869[13.3 Cy	891 8.2 Jo	889 10.0 Si	869 8.7 Ah	891 13.1 Pt
891 8.0 Jo	891[13.3 Pc	894 8.2 Hu	889 10 Mn	869 8.7 Jo	RV PEG
891 8.8 Sf	T DEL	V CAP	891 9.5 Fd	874 8.8 Jo	*222129*
892 7.1 Ad	204016	*210124*	891 9.7 Pt	878 8.7 Jo	882 12.5 L
894 8.0 GD	887[12.9 Pt	882 10.1 L	895 9.7 Wd	878 8.4 Th	S LAC
894 8.6 Hf	V AQR	888 10.4 Bl	898 10.0 Wd	879 8.3 Ry	222439
894 8.1 Bg	204102	914 11.5 Gy	898 9.9 Sh	880 8.7 Je	860 9.4 Ko
895 8.4 Wd	880 8.0 L	TW CYG	898 9.8 Hf	880 9.0 Mc	865 9.6 Ko
896 7.9 GD	887 8.0 Pt	210129	901 10.1 Wd	881 8.6 Jo	868 9.7 L
897 7.9 GD	W AQR	868 9.5 L	913 9.7 Gy	883 8.5 Jo	880 10.5 Ko
897 8.6 Hf	*204104*	883 9.8 Md	RR AQR	883 8.2 Ry	887 10.8 Ko
897 7.8 Ws	880 9.7 L	884 10.0 L	*210903*	885 8.6 Ah	891 11.4 Pt
898 8.6 Sh	U CAP	888 10.4 Md	889 14.4 L	885 8.8 Je	R IND
898 8.5 Wd	*204215*	X CAP	891[12.9 Pt	886 8.4 Me	*222867*
898 8.6 Hf	888[12.2 Bl	*210221*	Y PAV	889 8.2 Jo	841 10.0 Bl
899 7.3 Ad	886[13.9 Pc	888[12.7 Bl	*211570*	890 9.0 Mc	881 9.7 Bl
900 7.7 GD	V DEL	891[12.4 Pt	832 5.6 Ht	891 8.2 Jo	888 9.8 Bl
900 8.9 Sf	204318	RS AQR	X PEG	891 8.1 Pt	R LAC
U MIC	894[13.1 Bg	*210504*	211614	903 8.0 Ry	223841
203240	T AQR	882 13.5 L	882 14.0 L	910 8.2 Ry	868 9.7 L
881 11.9 Bl	*204405*	891 11.7 Pt	891 13.1 Pt	913 8.0 Ry	891 11.8 Pt
888 12.4 Bl	887 11.8 Pt	896 11.7 Pc	896 13.2 Pc	RV CYG	RW PEG
Z DEL	RZ CYG	Z CAP	T CAP	213937	225914
202817	204846	*210516*	*211615*	891 6.5 Pt	870 11.4 Jo
868 11.7 L	887 12.3 Pt	882 13.1 L	882 10.1 L	RR PEG	882 12.2 L
886 12.5 L	894 12.3 Bg	891 13.0 Pt	888 10.1 Bl	214024	887 10.5 Jo
887 12.8 Pt	S IND	R EQU	S MIC	891 13.5 Pt	891 11.5 Pt
896 11.1 Bg	*204954*	210812	*212030*	897 13.3 Fd	β PEG
ST CYG	881[13.1 Bl	882 13.7 L	888 10.0 Bl	μ CEP	225927
202954	X DEL	891[12.9 Pt	Y CAP	214058	880 2.6 Mc
868 11.3 L	205017	T CEP	*212814*	889 4.1 Si	890 2.5 Mc
886 12.9 L	868 11.2 L	210868	882[13.1 L		
887 13.0 Pt	884 10.3 L	860 9.4 Mn	888[12.5 Bl		

Variable Star Observations Received During July, 1932.

J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.	J.D.	Est.	Obs.
R Peg			**S Peg**			**W Peg**			**R Aqr**			**R Cas**			**R Cas**		
230110			231508			231425			*233815*			235350			235350		
886	9.7	Ah	882	12.1	L	896	9.3	Hu	887	8.1	Ko	883	7.5	Jo	901	8.6	Wd
891	9.5	Pt	891	12.2	Pt	900	10.7	Hu	891	8.3	Pt	883	7.6	Ad	914	8.6	Gy
914	7.7	Gy	**Z And**			**ST And**			**Z Cas**			883	8.3	Wd	**Z Peg**		
V Cas			232848			233335			233956			884	8.5	Mn	235525		
230759			891	10.7	Pt	866	9.2	Jo	882	13.5	L	885	8.0	Ah	882	12.2	L
865	11.7	Ko	894	10.7	Hu	869	8.9	Jo	**R Cas**			887	7.7	Jo	891	12.1	Pt
869	10.9	Jo	**W Peg**			883	8.6	Jo	235350			888	8.4	Wd	**W Cet**		
869	11.0	Ah	231425			886	9.4	Ah	860	7.5	Mn	889	8.6	Mn	*235715*		
881	10.1	Ko	869	8.4	Jo	887	8.8	Jo	864	7.8	Mn	891	7.6	Jo	887	8.7	Ko
885	9.8	Ah	882	8.9	L	891	9.5	Pt	866	7.6	Jo	892	7.6	Ad	**Y Cas**		
888	9.6	Ko	883	8.8	Jo	894	9.0	Hu	868	7.4	Ah	894	7.9	Bg	235855		
891	9.5	Pt	886	9.5	Ah	**R Aqr**			869	7.6	Ah	898	8.7	Wd	867	10.6	L
894	9.0	Bg	887	8.7	Jo	*233815*			869	7.5	Jo	898	8.7	Sh	869	10.8	Jo
			888	9.3	Hu	867	8.3	L	870	8.0	We	898	8.7	Hf	**SV And**		
									879	8.2	Mn	899	7.6	Ad	235939		
															891	13.1	Pt

Rapidly Varying Irregular Variables.

Star	J.D.	Est.	Obs.	J.D.	Est.	Obs.	Star	J.D.	Est.	Obs.	J.D.	Est.	Obs.
005840	**RX Andromedae—**						094512	**X Leonis—**					
	6883.8	[11.3	Ry	6898.8	12.9	Ry		6881.7	[11.8	Pt	6883.7	[11.8	Pt
	6886.7	12.9	Pt	6901.8	13.3	Ry	202946	**SZ Cygni—**					
	6886.8	11.8	Me	6908.7	[12.5	Ry		6872	9.7	Pt	6893	9.7	Pt
	6887.7	12.9	Pt	6909.7	13.1	Ry		6880	9.6	Pt	6895	9.5	Pt
	6891.8	11.8	Pt	6910.7	[12.5	Ry		6881	9.2	Pt	6896	9.1	Pt
	6893.7	11.5	Pt	6913.7	11.6	Ry		6882	9.1	Pt	6897	9.0	Pt
	6895.8	11.2	Ry	6914.7	11.2	Ry		6883	9.0	Pt	6898	9.2	Pt
	6896.9	11.6	Pt	6903.8	13.4	Ry		6886	9.4	Pt	6900	9.2	Pt
	6897.9	11.8	Pt					6887	9.3	Pt	6901	9.4	Pt
060547	**SS Aurigae—**							6891	9.7	Pt			
	6862.4	[12.5	L	6903.8	[12.5	Ry	213843	**SS Cygni—**					
	6897.9	[12.5	Pt	6912.8	[11.5	Ry		6857.2	11.2	Hr	6870.7	9.0	Bf
	6901.8	[11.5	Ry	6914.8	[11.5	Ry		6861.4	11.8	Ah	6871.5	8.6	Ah
081473	**Z Camelopardalis—**							6862.7	11.6	Cy	6872.4	9.0	L
	6854.7	10.2	Md	6886.7	11.4	Pt		6864.7	11.3	Bc	6872.5	8.4	Ah
	6865.4	12.8	L	6887.7	11.3	Md		6865.7	11.1	Cy	6872.5	8.8	Bc
	6866.4	13.0	L	6886.8	11.4	Me		6865.7	11.6	Jo	6872.8	8.6	Me
	6867.6	13.0	L	6887.7	11.5	Me		6865.7	11.3	Bc	6874.6	9.2	Jo
	6868.4	13.0	L	6887.7	11.4	Pt		6865.7	11.5	Bf	6874.6	9.2	Bc
	6872.4	13.0	L	6888.4	11.0	L		6866.7	10.1	Cy	6874.6	9.0	Bf
	6872.4	12.9	Be	6888.7	11.5	Me		6866.7	10.9	Jo	6874.8	9.0	Me
	6879.8	11.9	Md	6888.7	11.3	Md		6866.7	10.0	Bc	6875.5	9.4	Ah
	6880.4	11.5	L	6891.8	12.5	Pt		6867.6	9.9	L	6877.4	9.9	L
	6880.7	11.9	Pt	6893.7	12.9	Pt		6867.7	9.9	Cy	6877.4	10.0	Be
	6880.7	12.1	Me	6893.8	12.7	Md		6867.7	10.4	Jo	6877.5	10.2	Ah
	6881.7	11.8	Me	6894.8	13.1	Bg		6868.4	9.8	Ch	6877.6	10.2	Wd
	6881.7	11.9	Bg	6895.7	12.9	Pt		6868.4	9.7	L	6877.7	10.4	Me
	6881.7	11.9	Pt	6896.7	12.6	Pt		6869.4	9.6	Ah	6878.6	11.5	Jo
	6882.7	11.5	Pt	6896.7	12.8	Bg		6869.7	10.1	Jo	6878.7	10.9	Cn
	6882.7	11.8	Me	6897.7	13.1	Bg		6869.7	9.7	Bc	6878.8	10.0	Bf
	6883.7	11.8	Pt	6897.7	12.4	Pt		6869.7	9.6	Bf	6879.6	11.2	Ry
	6884.8	11.8	Me	6899.7	13.1	Bg		6869.8	9.7	Cy	6879.6	11.8	Jo
	6885.4	11.4	L	6900.7	12.9	Pt		6869.9	9.7	Ws	6880.5	10.7	L
	6885.8	10.8	Md	6901.6	[12.5	Bg		6870.4	9.1	Ah	6880.7	11.7	Pt
	6886.4	11.0	L					6870.6	8.9	Jo	6880.7	11.2	Me
								6870.7	9.2	Bc	6881.6	11.8	Jo

VARIABLE STAR OBSERVATIONS RECEIVED DURING JULY, 1932.

Star	J.D.	Est.Obs.	J.D.	Est.Obs.	Star	J.D.	Est.Obs.	J.D.	Est.Obs.
213843 SS CYGNI—					213843 SS CYGNI—				
	6881.6	11.4 Ry	6886.7	12.0 Bc		6892.6	11.9 Ry	6900.6	11.9 Bg
	6881.6	11.7 Bg	6886.7	11.8 Me		6893.5	12.0 Cn	6900.7	11.8 Hu
	6881.7	11.9 Ma	6886.7	11.8 Pt		6893.7	12.0 Hu	6900.7	11.7 Pt
	6881.7	11.8 Pt	6887.6	12.0 Jo		6893.7	11.8 Pt	6900.8	11.9 Ma
	6881.7	11.7 Me	6887.7	12.1 Me		6894.6	11.9 Ry	6901.6	11.7 Cn
	6881.7	11.5 Bc	6887.7	12.0 Bc		6894.7	12.0 Hu	6901.6	12.0 Wd
	6881.7	12.0 Bf	6887.7	12.0 Bf		6894.7	11.7 Bg	6901.6	11.7 Ry
	6881.7	11.6 We	6887.7	11.9 Pt		6895.6	12.0 Ry	6901.6	11.9 Bg
	6881.7	11.3 Cy	6888.5	11.6 L		6895.6	12.0 Wd	6901.7	11.7 Pt
	6882.6	11.7 Sf	6888.6	11.9 Wd		6895.7	11.8 Pt	6902.7	12.0 Hu
	6882.6	11.6 L	6888.7	12.0 Me		6896.7	11.6 Pt	6902.7	12.0 Ry
	6882.7	11.8 Pt	6888.7	12.0 Hu		6896.7	12.1 Hu	6903.6	11.8 Ry
	6882.7	11.9 Ma	6888.7	12.0 Mg		6896.7	11.7 Bg	6903.7	12.1 Hu
	6882.7	11.8 Me	6888.8	10.3 Si		6896.7	11.9 Pc	6904.6	11.9 Ry
	6882.7	11.8 Bc	6889.5	11.7 L		6897.6	11.8 Sf	6906.7	11.9 Ma
	6882.7	11.3 Cy	6889.6	11.7 Ry		6897.6	12.0 Fd	6907.6	11.7 Ry
	6883.6	11.8 Jo	6889.7	12.0 Bc		6897.7	12.0 Mg	6907.9	11.9 Ma
	6883.6	11.5 Ry	6889.7	12.0 Bf		6897.7	11.8 Cn	6908.6	11.7 Jo
	6883.6	11.8 Wd	6889.6	11.8 Jo		6897.7	11.7 Pt	6908.6	10.7 Ry
	6883.7	11.8 Pt	6890.7	11.9 Hu		6897.7	12.0 Pc	6909.6	10.3 Ry
	6883.8	11.8 Me	6890.7	11.9 Bg		6897.7	11.8 Bg	6910.6	9.5 Ry
	6884.7	12.0 Me	6891.6	11.7 Bg		6898.6	11.9 Ry	6912.6	9.3 Ry
	6884.7	12.0 Bc	6891.6	11.8 Sf		6898.7	11.9 Mg	6912.6	10.0 Jo
	6884.7	12.0 Bf	6891.6	11.7 Ry		6898.7	11.9 Pt	6913.6	9.3 Ma
	6885.5	11.8 Ah	6891.6	11.8 Jo		6898.7	11.9 Wd	6913.6	9.7 Jo
	6885.6	11.8 Jo	6891.7	11.9 Fd		6899.7	11.7 Hu	6913.6	9.2 Ry
	6885.7	11.9 Mg	6891.7	11.9 Pc		6899.7	11.9 Mg	6914.6	9.2 Ry
	6885.8	12.0 Md	6891.7	11.9 Hu		6899.7	11.7 Bg	6915.6	9.2 Ry
	6886.5	12.0 Ah	6891.8	11.7 Pt		6900.6	11.8 Ry	6917.6	8.6 Ry

SUMMARY OF OBSERVATIONS FOR JULY, 1932.

Observer	Initial	Vars.	Observations	Observer	Initial	Vars.	Observations
Ahnert	Ah	46	133	Lacchini	L	140	233
Aldwell	Ad	12	48	Marsh	Ma	13	19
Baldwin, G. C.	Bd	2	5	McLeod	Mc	15	38
Baldwin, J. M.	Bl	93	271	McPherson	Mp	8	9
Beck	Bk	22	25	Meek	Me	78	131
Benini	Be	11	18	Mennella	Mn	20	36
Bigelow	Bw	10	10	Millard	Md	21	60
Bouton	B	29	30	Monnig	Mg	20	36
Brown, A. N.	Bn	2	4	Peltier	Pt	192	288
Buckstaff, E.M.	Bf	12	36	Percival	Pr	4	4
Buckstaff, R.N.	Bc	16	58	Pickering	Pi	11	11
Bunting	Bg	27	48	Proctor	Pc	22	32
Chandler	Cn	8	18	Recinsky	Rc	6	18
Chandra	Ch	1	1	de Roy	Ry	8	66
Cilley	Cy	28	52	Shinkfield	Sl	38	89
Ensor	En	79	186	Shultz	Sz	9	11
Ford	Fd	19	24	Simpson	Si	13	74
Godfrey Club	GD	5	24	Smith, F. W.	Sf	12	32
Gregory	Gy	25	34	Smith, L.	Sh	11	18
Hartmann	Hf	11	26	Theile	Th	14	49
Houghton	Ht	61	81	Wares	Ws	6	6
Hurahata	Hr	5	32	Webb	Wd	19	82
Jansen	Je	7	20	Wetherbee	We	23	27
Jones	Jo	78	309				
Kohman	Ko	24	82	Totals		49	378	3086

ciation to be the discoverer of a comet this year and Peltier lays claim to the discovery of several others in previous years. It would seem that comet seeking when assiduously undertaken leads to real reults.

August 9, 1932. LEON CAMPBELL, Recorder.

Zodiacal Light Notes

By W. E. GLANVILLE

JAPAN. Under the direction of Professor I. Yamamoto and Mr. M. Inaba, Kwasan Observatory, a series of six charts for reporting Zodiacal Light observations has been prepared by Messrs. Koyama and Araki. The charts are based on the ecliptic. Each chart contains two zodiacal constellations and shows 60° in ecliptic longitude and 50° in ecliptic latitude. The principal stars are plainly plotted and the cartography has been well done by Mr. S. Furukawa. Observers generally should find similar charts valuable in delineating the appearance of the Zodiacal Light and the Gegenschein. The Kwasan Observatory reports that throughout the empire the Zodiacal Light has not been so strong as it was in 1930.

SOUTH AFRICA. From Mr. E. Heyes, a member of the recently organized Zodiacal Light Section of the Astronomical Society of South Africa, has come a communication of a remarkable evening observation on July 8 at his station near Prieska. He says: "I watched carefully from 9:20 P.M. until 10:00 P.M. and repeatedly observed *strong pulsations* extending three or four degrees past Virgo towards Libra. The pulsations came at easy intervals of from a quarter to half a minute traveling mostly south to north. They reminded me of a man who, hidden behind a sandhill some distance away in the dark, turned on an electric torch, then switched it off, then on again; its luminosity thus varying but with this difference that the Zodiacal Light pulsation does not shut down its light altogether." Mr. Heyes adds that later he learned of very stormy weather with high winds off the Cape of Good Hope. Evidently atmospheric conditions were much disturbed. He found the north boundary of the Light clear cut, the south boundary diffuse and the greater part of the Light south of the ecliptic.

AUSTRALIA. From Mr. J. Fraser Paterson, Broken Hill, Australia, latitude 32° S., longitude 141° 30′ E., a set of evening reports from September 1, 1931, to March 31, 1932, has been received. During the first week in September Mr. Paterson found the Light "equal in brightness to the Milky Way near Centaurus." For the rest of the period it was of average intensity and often faint. On October 4, 11, 12, and 13, he noted sudden beginning and ending. On October 29 and 31 he noted an extension of the Light from the base towards the south geographical pole. On February 13 he remarked an "unusual brightness at south geographical pole. Arch about 20° in altitude; lasted about two hours."

The writer reports the following observations:

MORNING ZODIACAL LIGHT. On July 15 at 3:00 A.M. in a clear sky the Light was seen as a roundish object extending over Auriga and the northern half of Perseus; thence southwest to Aries, Beta and Gamma Arietis being just clear; thence round to the northeast horizon, the Pleiades being covered by it. No trace was visible beyond Aries west. Possibly this form of the Light gave rise to the Arabian description of "false dawn." At 3:20 the Light merged in the dawn. On September 7 at 3:40 A.M. the Light was fairly strong but Venus in east Gemini

made it impossible to determine the apex. The north boundary passed slightly south of Lambda and Mu in Ursa Major and 38 and Sigma in the Lynx. The south boundary passed about halfway between Beta and Delta in Cancer. Sky perfectly clear.

GEGENSCHEIN. From 11:50 P.M. to 12:10 A.M., September 8 and 9, the Gegenschein was observed in eastern Aquarius and western Pisces. It covered Eta, Zeta, and Gamma in Aquarius, thence curved over Theta and Iota in Pisces, thence round Psi and Tau in Aquarius, thence curving back to Gamma in Aquarius. Diameter, east and west, about 22°; north and south, about 18°. It was extremely faint. By plotting this description it will be clear that the greater part of the object was north of the ecliptic. The Morning Zodiacal Light will continue well placed for observation until next February. The Gegenschein presents its best appearance for the year until towards the middle of October when it assumes an elongated shape. Reports are always welcome.

The Rectory, New Market, Maryland.

General Notes

Miss Carolyn Gesler, assistant at the Yale Observatory, died on July 26 as a result of an automobile accident. She and a friend, a Miss Radcliffe, were motoring in Alabama when the car skidded without warning on a sandy road. Miss Radcliffe escaped without injury.

Miss Gesler was in charge of important work at the Observatory with which she had been connected since 1923. She had supervised the parallax measurements and reductions and was engaged in keeping up to date the extensive card catalogue of parallaxes and of additional information for the Bright Star Catalogue. Her death is not only a severe loss to Yale Observatory but to astronomy in general. Dr. Schlesinger expresses the opinion that she would undoubtedly have risen to the very front rank among women astronomers.

Miss Eleanor A. Lamson, one of the astronomical staff of the U. S. Naval Observatory, died on July 27.

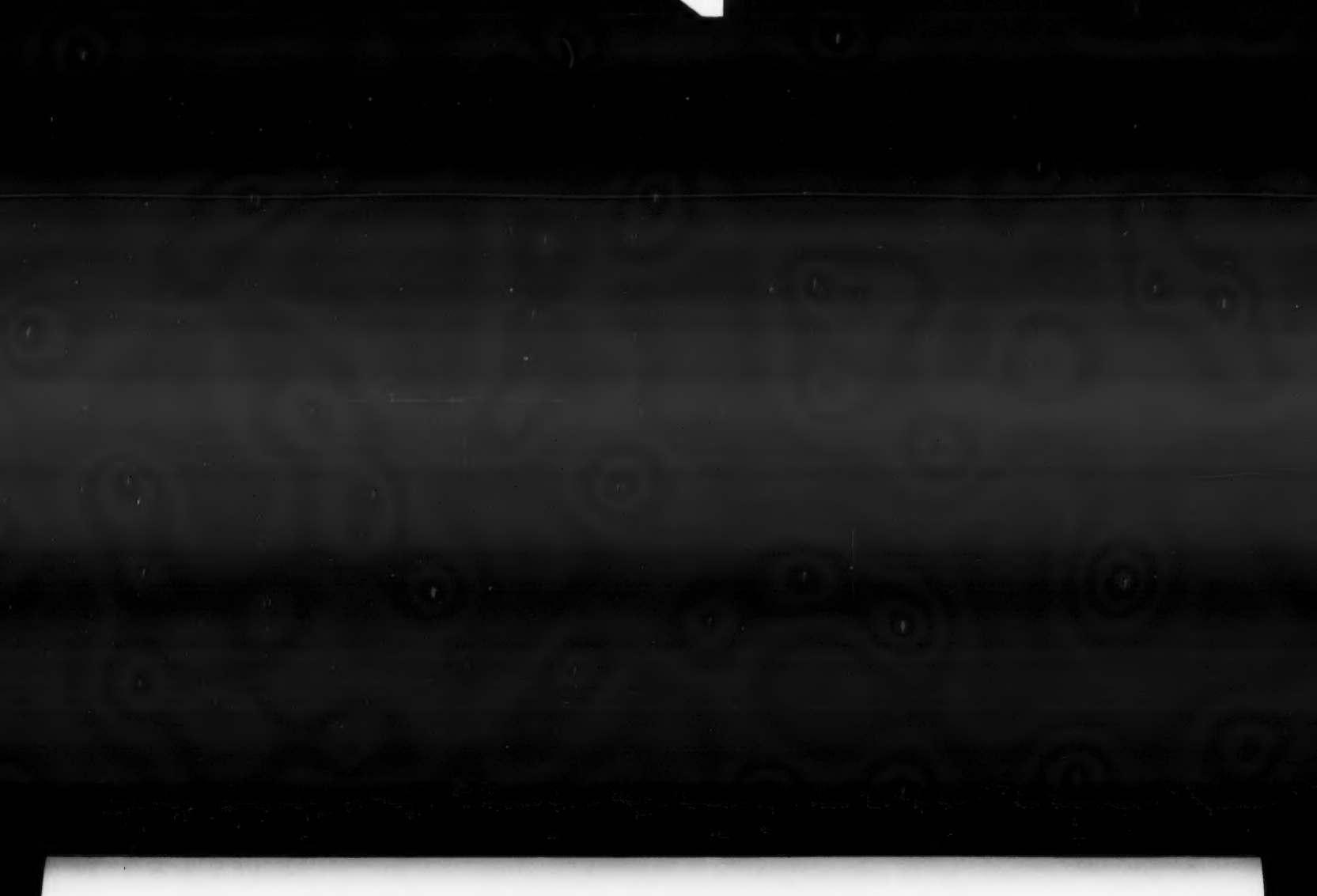
In the death of Miss Lamson the Naval Observatory has suffered a very great loss. She was a graduate of George Washington University and came to the Naval Observatory in 1900. Immediately, she showed such unusual interest and ability in astronomical work that she forged ahead. She has been in charge of the Computing Section for many years. In that capacity she participated in most of the scientific work of the Observatory. All of the publications of the Naval Observatory since 1900 bear the imprint of her painstaking and thorough care and her devotion to duty.

Besides her other manifold duties at the Observatory, Miss Lamson computed the orbits of a number of the asteroids and comets. More recently she was delegated to assist in the laborious reductions of the gravity work done by Dr. Meinesz of the Netherlands, in 1928, and again in 1932. The results of the first work have been published in the publications of the U. S. Naval Observatory, Second Series, Volume XIII, Appendix I. The reductions of the work recently performed by Dr. Meinesz and Professor Fields of Princeton, in 1932, were only partially completed at the time of Miss Lamson's death.

Miss Lamson was a member of the Astronomical Society of America and took a keen interest and pleasure in attending all of the meetings of that Society.

J. F. HELLWEG.

The Skyscrapers Amateur Astronomical Society of Rhode Island, on September 6, had the pleasure of hearing lectures on "The Eclipse Illusion" and "The Value of Coöperative Work by Amateur Astronomers" by Dr. W. H. Steavenson and Mr. B. M. Peek, prominent English amateurs.

An Observatory Under Joint Auspices.—Recently plans have been announced by which the University of Chicago and the University of Texas will coöperate in the construction and operation of a new observatory. Quoting from a communication from Dr. O. Struve, director of Yerkes Observatory: "The present plan involves the construction of a concave mirror of 80 inches aperture. When this is finished it will be the second largest of its kind in the world, surpassed only by the 100-inch of the Mt. Wilson Observatory. . . . The question of the location of the Observatory is a very important one and in coöperation with the University of Texas we sent an expedition to Texas during this past summer. The atmospheric conditions in various places were carefully studied. This expedition was headed by Dr. C. T. Elvey, a member of the Yerkes Observatory staff and he was assisted by Mr. T. G. Mehlin. They made a large number of observations with two telescopes, one belonging to the Mt. Wilson Observatory and the other to the Yerkes Observatory. The results of the tests are now being discussed, but it seems probable that with the approval of the Regents of the University of Texas, the new observatory will be located on a peak in the Davis Mountains. The state of Texas is building a scenic drive through this part of the country and is opening several state parks. . . . The plan provides that the director of the Yerkes Observatory will be the director of the new institution, which will bear the name of the McDonald Observatory of the University of Texas. This name is in commemoration of the late William J. McDonald of Paris, Texas, who died in 1926 and who bequeathed to the Regents of the University of Texas a fund which is now slightly in excess of $840,000 to be used and devoted by said Regents for the purpose of aiding in erecting and equipping an astronomical observatory to be kept and used in connection with and as a part of the University for study and promotion of the study of astronomical science.'" Further items will be published from time to time as to the progress of this coöperative project.

Dr. Max Wolf, director of the Königstuhl Observatory, Heidelberg, leader in astronomical research for many years, much beloved by all who knew him because of his gentle and genuine character, died on Sunday, October 2, after a painful and lingering illness. He was sixty-nine years of age.